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Riter-Conley Manufacturing Company

STEEL CONSTRUCTION

Pittsburgh

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GAS OVENS VS. VERTICAL RETORTS.

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We are building a battery of Koppers horizontal Cross Regenerative Gas Ovens for the Berlin Gas Company.

Isn't that the place where they are supposed to have Dessau Verticals in their highest state of perfection?

It surely is, but the "World do move," and the Berlin Gas Company is wide awake.

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Here they have horizontals, inclines, and two different types of continuous verticals; and we are building a battery of cross regenerative gas ovens with a guarantee to produce better carbonizing results than they have obtained on any of their different types of retorts.

They Will All Come To It.

See our Brochures Nos. 3 and 4.

H. KOPPERS COMPANY,

CONSTRUCTORS OF BY-PRODUCT COKE AND GAS OVENS,

5 S. Wabash Avenue, - - - - Chicago, Illinois.

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[All Rights Reserved.]

The Astoria Plant of the New York Consolidated Gas Company.

[Prepared for the JOURNAL, by MR. C. C. SIMPSON, JR.]

CHAPTER II.

Fig. 21 shows the progress made (early in the spring of 1905) on

Fig. 21.

the first coal gas unit, the camera in this case being set up on coordinates, C-15, looking northwest. On the left (or north) are the purifier houses, both practically completed, and north of these may be seen the condenser and tar extractor houses, in about the same stage of completion, with the steel all erected and most of the brick laid. Again, to the north, are the two retort houses, the easterly or horizontal one having its steel frame completed and the brick walls started, while the inclined house, which your readers will have to take on faith, for unfortunately it does not show in the picture, has been practically completed, as far as the exterior is concerned, and is now ready for the installation of the retorts. However, to get some views which will show more detail, let us go nearer to the different buildings. The steel frame of the horizontal house, which, on account of its great length, does not show to advantage in the general photograph, is more clearly seen in Fig. 22. The dormer windows in the roof are not, as might be thought at first glance, placed there for artistic effect, but are a portion of the coal storage bins which serve the retort charging machines.

Fig. 23 is an exterior view of the east purifier house, inside of which the work of installing the boxes has been progressing rapidly, as can be seen by looking at Fig. 24—an interior view of the upper level. A comparison of the relative size of the photographer's Italian assistant, who is holding the signboard at the left of the illustration, with the box on which he is standing, will remove any doubt as to the accuracy of the following data. This east house, which is a duplicate of the west one, contains 12 purifiers, arranged in 2 series of 6 each. The boxes are 40 feet square, and 8 feet in depth, each having a capacity of 7,680 bushels of oxide, arranged in two 42-inch layers, and a set of 6 boxes has a daily capacity of 16,000,000 cubic feet. The lids are sealed with water to a depth of 36 inches, and the controlling valves are of the hydraulic seal type, operated by compressed air. Compressed air also operates the traveling cranes for handling the lids. Why air, when electric power will be available? Well, electric motors spark at times and no repetition of the following case was desired. There *was* a man some years ago looking for something in an inclosed purifier house, who struck a match to find it. He left in considerable haste, however. Subsequently his employers ordered a new purifier house and his sorrowing relatives a tombstone.

Fig. 25 shows the main and valve system at the lower level in the west purifier house, and also shows the concrete trough for the oxide conveyor. Spent oxide will be discharged from the boxes to the lower floor of this house and, after revivification, shoveled onto one of the oxide conveyors, from which it will in time be picked up by an elevator and deposited where required. The two sets of elevators and conveyors to be installed in this house are steam-driven throughout and have a combined hourly capacity of 3,340 bushels.

Fig. 26 is an exterior view of the west condenser and west tar extractor houses, completed, ready for the installation of apparatus, and, crossing over to the east side of the unit and entering the east condenser house we see (Fig. 27) work in progress on a set of 3 rotary ammonia scrubbers. These scrubbers, which are 10 feet in diameter, and 22 feet long, are driven by individual steam engines, and have each a capacity of 4,250,000 cubic feet in 24 hours. In the foreground can be seen the completed condenser foundations.

Fig. 28, taken on the same day, shows the erection of a set of 3 tar extractors at the north end of the west tar extractor house. These extractors consist of a 2-chamber submersion washer, and a friction condenser of 1 chamber, with ammoniacal liquor jets. The 3 extractors have a daily capacity of 10,000,000 cubic feet of gas. In this same building, though not erected at the time the other photographs were taken, 3 naphthaline washers will be installed, containing each 6 absorption sections and designed to use either water gas tar or anthracene oil as the absorbing fluid, together with a set of 3 cyanogen washers, having a daily capacity of 10,000,000 cubic feet. A cyanogen mud tank, a filter press, and a set of tanks and pumps, for the storage and circulation of the various liquids, complete the equipment of the west tar extractor house, of which the east house is a duplicate.

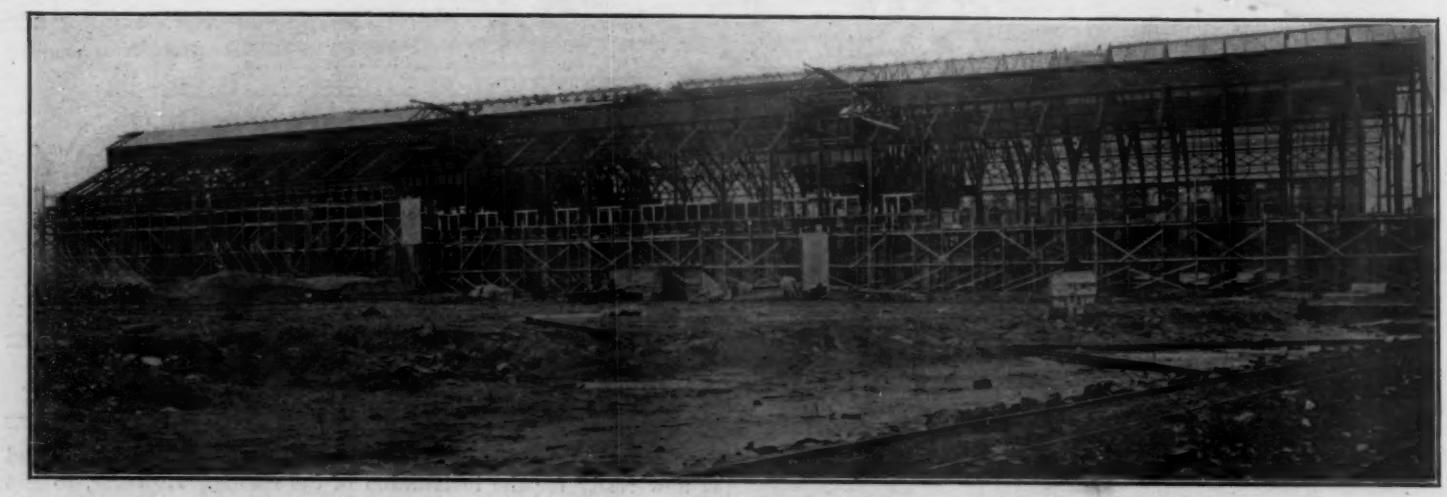

Fig. 22.

Fig. 23.

respectively, show the work of setting the retorts in the east or horizontal house. This house is to contain 480 through retorts, arranged in 6 batteries, each battery consisting of 10 benches of 8's. The retorts, which are set horizontally, are 21 feet 9 inches in length, and of a ⏛ cross-section, 26 inches wide by 16 inches high, with 8-inch standpipes rising from the mouthpieces at each end to the hydraulic mains. Each bench is heated by 2 generators, the large manholes seen in the floor at the right of Fig. 29 being the upper ends of chutes provided to convey a certain amount of the coke discharged to the generator fuel bed. In Fig. 30 can be seen 2 of the 90-foot battery stacks, and also a section of the overhead coal bins, in which can be stored 1,800 gross ton of coal delivered to these bins from the track

Fig. 24.

But gas must first be made before it is purified; so let us return to the retort house. Figs. 29 and 30, taken in July and November, 1905, hoppers by a series of conveyors at the rate of 135 gross tons per hour. All charging and drawing of the retorts are done by electrically

Fig. 25.

Fig. 26.

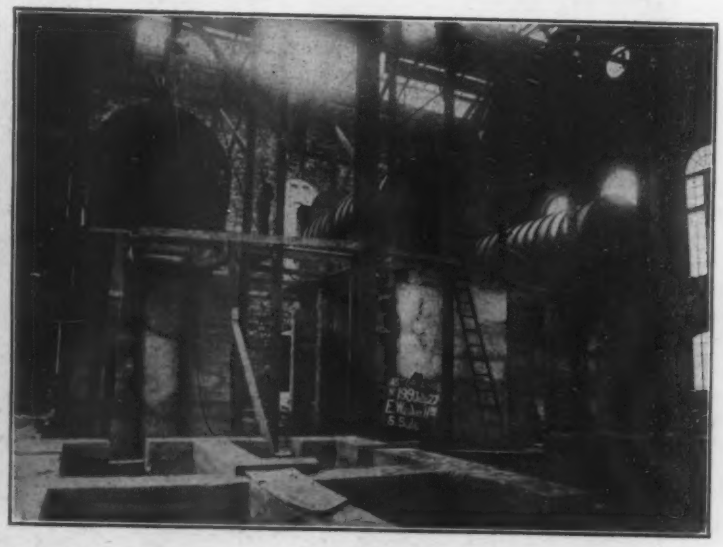

Fig. 27.

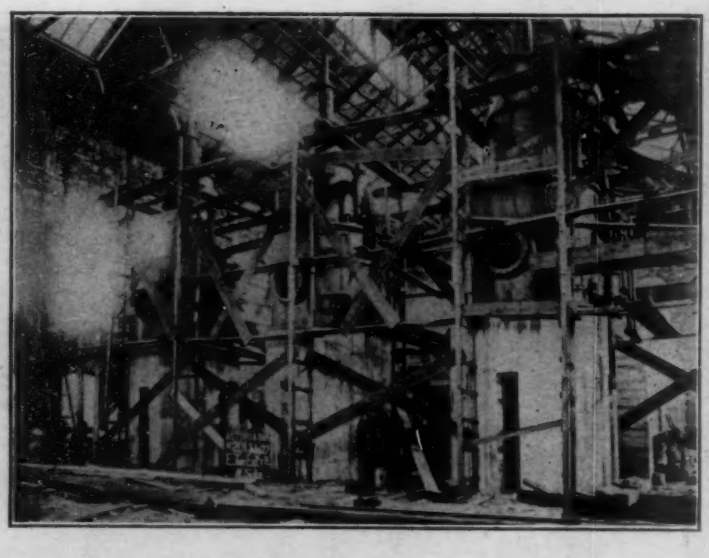

Fig. 28.

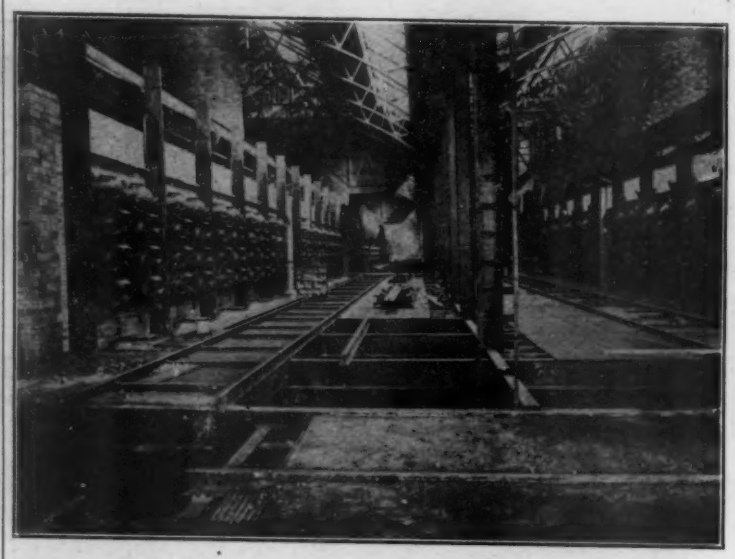

Fig. 29.

Fig. 30.

Fig. 31.

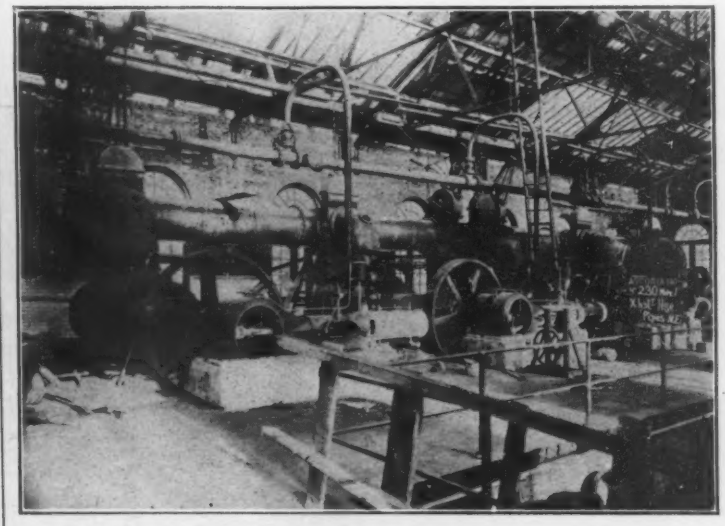

Fig. 34.

Fig. 32.

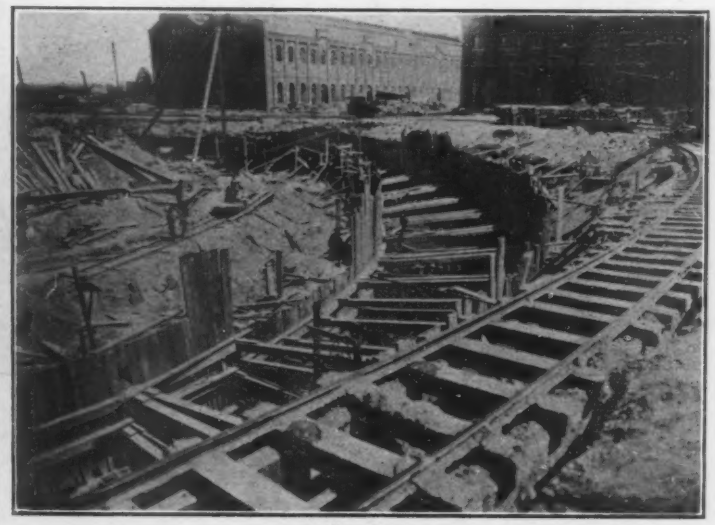

Fig. 35.

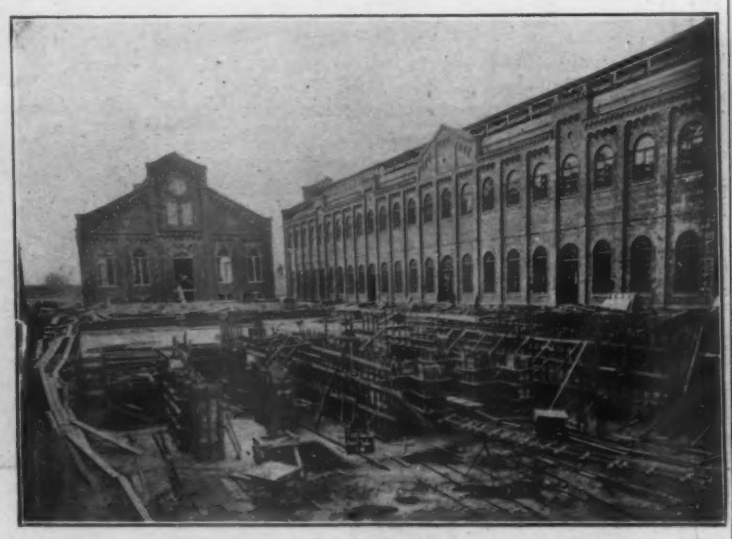

Fig. 33.

Fig. 36.

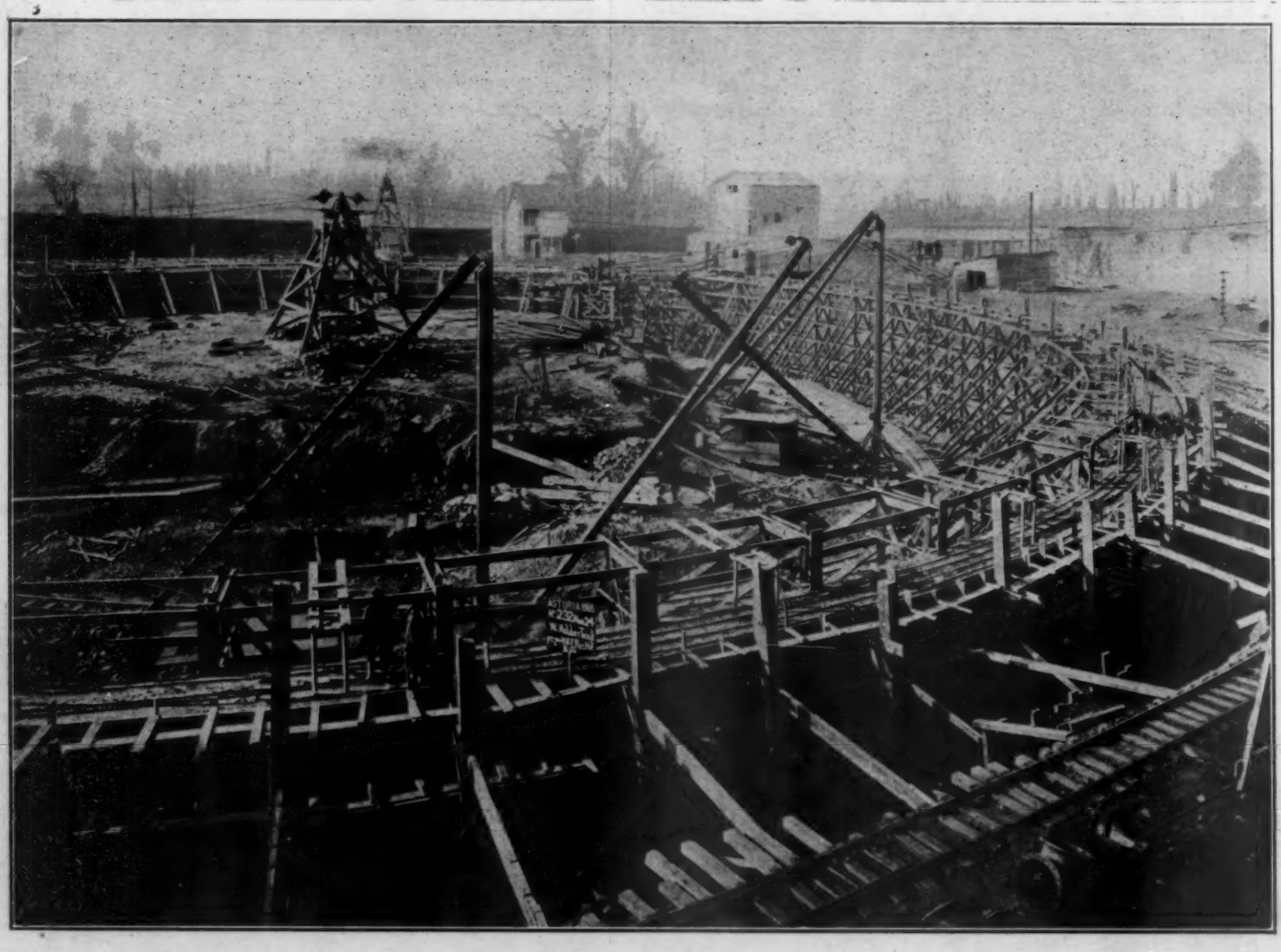

Fig. 37.

Fig. 38.

Fig. 39.

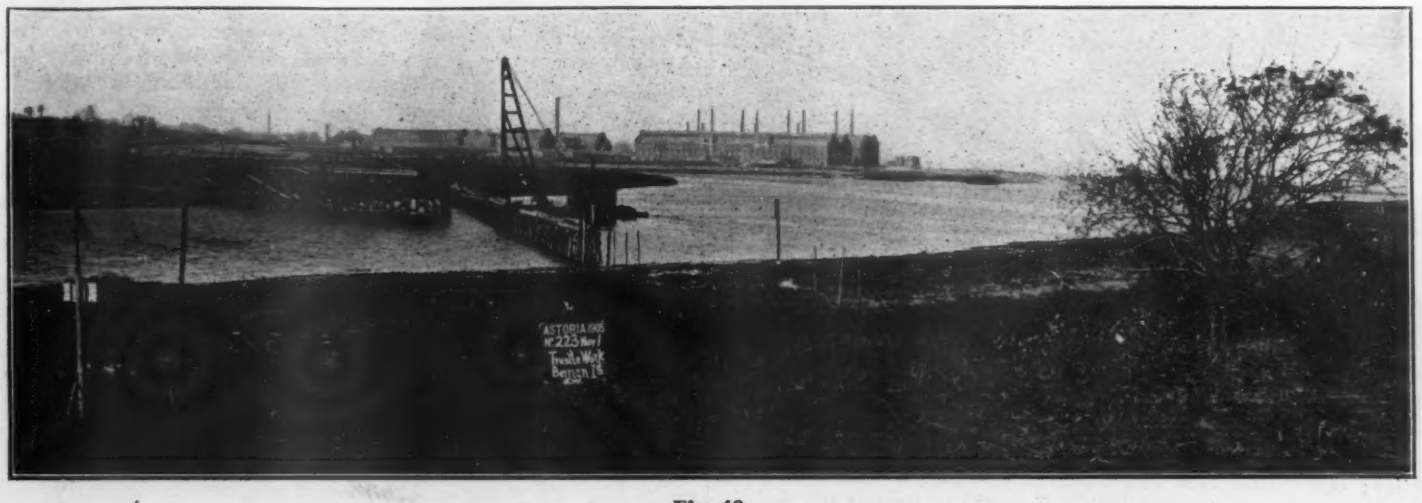

Fig. 40.

operated machines, and the coke is removed from the house to the coke bins by a system of conveyors, quenching being accomplished *en route*. The work of setting the retorts in the inclined house is shown in Fig. 31. There are to be 576 retorts, set at an angle of 33° to the horizontal, the house containing 8 batteries, each consisting of 8 benches of 9's. The retorts are of ⏢-section, 15¼ inches by 22¼ inches at the charging end, and 2½ inches wider at the lower or discharging end. In length they are slightly shorter than the horizontals; 1 foot 9 inches to be exact. A 7-inch standpipe rises from the charging end of each retort to the hydraulic main, and at the discharging end of the benches are generator coke chutes similar to those in the horizontal house. One generator serves to heat each bench.

Between the retort houses work has been started on an underground tar storage tank, which is seen in Fig. 32, ready for the placing of the roof. This tank, which is constructed of reinforced concrete throughout, is divided by a partition wall into a separate compartment for each half of the unit, each of these compartments containing a gravity separation tank, 8 feet by 10 feet by 7 feet, in addition to the space for ammoniacal liquor and tar storage, the entire tank being designed to hold 35,000 gallons of liquor and twice that amount of tar. After the roof had been placed a pump house, to contain the tar distributing and ammonia circulating pumps, was to be built upon it, and while this work was in progress a similar, though considerably larger, set of underground tanks is being built between the 2 purifier houses for the storage of ammonia. Fig. 33 gives a general idea of the construction of these tanks, which were 178 feet long, 85 feet in width, and 17 feet deep. The total ammonia storage available, exclusive of the separating compartments, is 750,000 gallons. In the background of this picture can be seen the completed coal gas meter house.

Fig. 34 is an interior view of the first unit exhauster house, showing the 5 gas exhausters and most of the piping in place. Each exhauster is driven by a 58-horse power, direct-connected steam engine, and has a capacity of 6,700 feet per minute. The building also contains air exhausters, which are so connected to the purifiers as to assist materially in prolonging the life of the oxide; an air compressor which furnishes such compressed air as is required for the unit.

And now we reach the holder. Excavation for the concrete tank of the first unit storage holder was commenced early in the spring of 1905, and a little later work was also started on the tank of the next holder to the east. Though but one storage holder would be required for some time to come, it was thought advisable to do at this time the necessary excavation and concrete work on the adjoining tank, to avoid any danger of disturbance of the west holder when in service.

Fig. 35 shows a portion of the excavation for the west holder tank, and Fig. 36, resembling a scene on the Panama Canal, is the work on the next tank to the east. A later view of the west tank, with its reinforced concrete side walls practically completed, is shown by Fig. 37. The earth core in the center will later be sloped off as a cone and covered with concrete. The great size of these concrete tanks can best be illustrated by the statement that the Society of Gas Engineering, of New York City, last summer held its annual banquet on the top of the east tank cone; 250 members and guests being seated, and still ample space was left for the caterer's kitchen and service. But perhaps you were there and know all about it. If you were not, you certainly missed a "corking good time." To get down to cold, hard figures, however, both tanks are 300 feet in diameter and 48 feet deep at the rim. Fig. 38, a still later picture, shows in the foreground the excavation for the east tank nearly to grade, and behind it the finished concrete walls of the west tank.

The progress of the work on the north shore docks up to the fall of 1905 is shown by Fig. 39, the cribwork in the foreground being a part of one of the island piers to be used for docking coal barges.

Fig. 40 (a view taken from Berrian's Island, looking southwest towards the first unit) closes the year 1905 and the chapter. Practically all the buildings have been completed as far as the exterior is concerned, and the smoke issuing from the boiler house stack would indicate that steam is available. The timber trestle crossing the creek in the foreground is the first step in the annexation of Berrian's Island to the mainland, as provided for in the general ground layout.

Quick Construction Work on the Sumter (S. C.) Gas Works.

The entire plant of the Sumter (S. C.) Gas and Power Company was put into practical operation the 26th November, 1912, since which date it has gone along without the slightest hitch. This installation was made in record time, exactly 101 days having been taken up from the time the foundations were commenced to the time of starting the distribution of gas. A fortunate feature was that no grading was necessary, and the nature of the soil was such that the required excavation work was done within a week.

The works are situated on the Charleston division of the Atlantic Coast Line, and a 200 foot 6-inch elevated trestle siding was brought directly into the property adjoining the coal and coke storage sheds. The storage capacity of this structure amounts to 150 tons (net) of coke on second floor, and 66 tons (net) of coal, the latter being stored in the first floor. Part of the first floor is partitioned and neatly furnished off, fitting it perfectly as a convenient place for the storage of appliances, meters, piping, etc. In one corner of this room has been placed a shower bath, wardrobe and toilet. To the left is a space for a large work bench.

Fig. 1 affords aview of the railroad trestle and the coal and coke

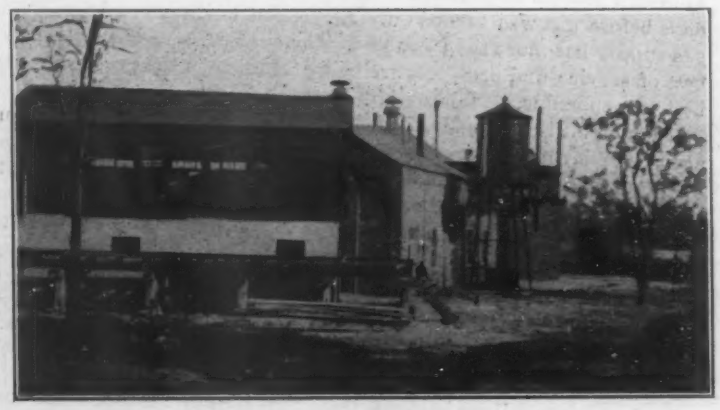

Fig. 1.

shed: and Fig. 2 gives a glimpse of the layout of the works proper. The generater houses contain one Gem City, vertical horse power

Fig. 2.

boiler; one United Gas Improvement Company's standard Lowe, double superheated, 4 feet 6 inches diameter water gas set, and the floor is planned for duplication at any time. In fact the oil pumps, blowers and steam turbines have been installed in duplicate.

A 11-foot, bored artesian well supplies the works with water, which is pumped into an overhead storage reservoir of 5,000 gallons capacity, which affords an excellent automatic head. The meter room carries a handsome specimen of station meter from the shops of Messrs. D. McDonald & Co., of Albany, which meter is equipped with the Hinman drum; also, one 10-inch Connelly automatic governor. Outside, directly at the rear of the building, were placed two, 10 inch diameter by 6 feet high, purifying boxes, with independent valve system. All connections throughout the works are of cast iron, 10 inches diameter.

The gasholder (of 50,000 cubic feet capacity) was erected by the Kerr-Murray Manufacturing Company, and the vessel is of good appearance, and excellent in construction. The inlet and outlet pipes are 12 inches in diameter, with by-pass arrangement. Provisions have been made in the pipe lines to later on install an exhauster and tar extractor, with a view to operating the entire plant on the relief holder system.

To the right of the holder is an oil tank of 16,000 gallons capacity, into which the oil is unloaded by gravity. It can be pumped thence, directly from the tank car to the water gas set.

A perfect drainage system takes care of the rainfall on the plant and entire property with its surroundings. The tar and oil, overflowing from the seal pots, is led with the other drain connections to a tar separator and well. The entire plant is up-to-date in its equipment, and the neatness of its design has been carried out beyond that of the average small gas works. Fourteen miles of mains (of which 12 are laid) will complete the entire distribution system. The main feed-pipe, from the works to the city is 10 inches; then, through the business section and closely populated districts, the lines are 8 inches to 6 inches; then to the outskirts with 4 inches; where the growth of Sumter is seemingly not possible, 2-inch lines have been laid for short distances.

The residents of Sumter were very responsive. On learning of the sort of people who were conducting the enterprise the Sumterites, to the number of 209, signed up as prospective consumers, also agreeing to install kitchen appliances, etc., all these being in hand at least 30 days before gas was turned on. At present writing the demand for gas supply has more than doubled. Consumers have been given the best of service and prospects are being handled in the promptest and best ways possible.

Much credit is due to Mr. L. I. Pollit, President and General Manager, who devoted a very large part of his time to the supervision of the plant and main system during the installing. To secure a first-class plant at reasonable cost was his desire. The fact is that the finished task stands second to none for completeness and capacity to serve the people of this historic old town, which is rapidly awakening to its opportunities through the sledge-hammer commercial pulse that is to-day, and everyday, rejuvenating the South of the Century. Mr. Edward L. Rieha, of Baltimore, Md., was the Engineer of-Construction during the planning, designing and completion of works.

THE legal proceedings between the authorities of Fresno, Cal., and the representatives of the Pacific Gas and Electric Company, in the instance of enforcing a gas rate of $1 per 1,000 cubic feet, have been dismissed by mutual consent. The authorities accepted the proposition of the Company to supply gas at $1.10 per 1,000.

Public Service.

[A paper prepared by MR. C. E. PAIGE, of the Tenney Service Association, Boston, for the Atlanta Meeting, N. C. G. A.]

One of the most used and most abused sayings in our language is to the effect that "a corporation has no soul." To the average person to-day this has become almost an axiom; and this is due largely to two facts: First, the absence of personality in the average corporation; and, second, the narrow policies of the corporations themselves. These points need no demonstration. To the layman the public service corporation has no personality—it is a big, intangible power, in which each employee is but a cog in the machinery of organization. He is not dealing with a man, but with a machine. Consider with this the narrow, "public be-damned" policies of many of our great corporations in the past, and there is no cause to wonder that the consumer to-day shrugs his shoulders and says, "The corporation has no soul."

Our organization is honestly trying to meet and overcome these conditions. For years, with the rest of you, we have been giving the best of service of which we were capable, at the lowest rates compatible with conservative management. But this has not been enough. Our companies, though recognized as fair and liberal, still had no "soul." Then it was we tried to analyze the situation and look for the cause and effect, with the result that we became convinced we must make the personality of our operating organization as real to the public as it is to ourselves. From this conviction was born "Tenney Service," which, in two words, gives the public: First, the dominating personality of our organization; second, the essence of our public policy.

We believe the science of business is the science of service, and we also believe that he succeeds best who serves best. This being our conviction we have organized an Association known as the Tenney Service Association. It is comprised of the managers of the properties owned and controlled by the C. H. Tenney Company, of Boston. It includes also the power engineer and the manager of the publicity department. Its purpose is to promote co-operation and to promulgate the doctrine of Tenney Service throughout the territories in which our companies operate.

Our watchwords are Co-operation, Efficiency, Progress. We believe that co-operation is the most important factor in the success of the public service corporation, and we believe that efficiency results from co-operation. We believe that progress must necessarily result directly from co-operation and efficiency.

In working sincerely to accomplish the results we have been much surprised to learn that hitherto unsuspected fields have been opened up for all of us, and the monthly meetings of our Association have, in a sense, developed into a clearing house for information, which is of inestimable value to the members of the organization.

The Association deals almost entirely with matter of publicity, and suggestions received from the various members by the Secretary are submitted at the next meeting, where the necessary time is taken for a full-and-fair discussion. As a result we feel that we are developing an efficiency in our service which, to say the least, is unusual.

We have an emblem, which is a small, gold-and-blue enamel button, circular in shape. In the center is a "T," in blue enamel, on a gold background; and in a circle around this "T" are the words, "Tenney Service." The use of this emblem is not confined to the members of the organization. They are worn by nearly all of the employees as an indication of their loyalty to the Company and of their pride in the efficiency of the service rendered by themselves. All of our transportation equipment has this emblem, either painted on it in some prominent place, or put on by means of German transfers. Copies of the emblem have been placed on our appliance store windows, and on the covers of our pulmotor boxes (the pulmotor is being loaned gratuitously to the public through the local physicians). In all cases the Tenney Service Emblem is reprinted at the bottom of our advertising copy in the newspapers. In this way the fact that there is such a thing as Tenney Service is kept before both the employee and the public,

Doubtless other companies have very efficient methods of caring for the needs of the public, but we know of very few cases, however, where the public has been brought to realize and appreciate the value of this service. For example, the average housewife knows she can place an order at the grocery or department store and have the material delivered some time during the day; but, if any of the material that is received is unsatisfactory on delivery, there is usually 2 or 3

days' delay before the matter can be adjusted. Service is rendered in a grocery or department store 10 or 12 hours a day, but a public service corporation stands ready to deliver service, and efficient service, every hour and any hour of the day, with a promptness far in excess of the degree reached by any other mercantile business.

We believe we have the most efficient service in our territory. We are not satisfied with this, however, and are continually striving to improve it in every way possible, with the ultimate idea of approaching a mark of 100 per cent. efficiency. We believe that this knowledge on the part of the public will result in the appreciation of our work and in the spirit of co-operation, from them. The idea has already been carried out for a sufficiently long period to demonstrate the validity of the theory.

I do not know how I can better tell you the way in which we apply the principles of Tenney Service throughout our territory than by repeating here the so-called "Tenney Service Talks," which have recently been published in the newspapers in the territories which we serve. A general introduction appeared in the papers before starting the series of talks. This introduction was as follows:

The Story of an Idea.—There is a saying to the effect that a good and worthy idea, once conceived, can no more be checked than can the tiny mountain stream which, once started on its way, continues in ever-increasing strength, through or by every obstruction, until it flows as a majestic river into the boundless ocean. The conception of something good, and, therefore, worth while, in some man's mind is his contribution to the great ocean of human achievement, and which will inevitably, though often not during his lifetime, find the channel which will lead it, as the river is led, to its ultimate fulfillment.

We are applying the forces of scientific organization to the fulfillment of the idea that the best interests of a public service corporation are coincident with the best interests of the community which it serves. We believe that the company which serves its public honestly and well will earn and enjoy the respect and goodwill of that public, and that the public service corporation, far from being regarded askance and as a thing aloof from the interests of the everyday citizen, should work in the closest harmony and understanding with the needs and life of the community.

Our idea is growing. Where 10 years ago we began to apply our principles of public business in one city of 60,000 inhabitants, we are now applying them in over 50 cities and towns with an aggregate population of more than 1 million. The growth of the Tenney organization has been one of the striking developments of the past decade, and its expansion and success can be traced directly back to the fundamental business principle that real success can come only through real service.

The keynote of our organization is enthusiasm for the principles of Tenney Service. The great power of enthusiasm in our case rests on the firm conviction that our leaders are right, and that through their efforts the days of old-fashioned, stupid selfishness in the management of public service corporations will soon be gone forever. We believe that the day is now dawning as a new era in public service work, an era, in which the public servant's first aim will be to give the best service of which he is capable to the public which employs him. We believe that our own interests are inseparable from yours, that our greatest interest lies in the growth and prosperity of the communities which we serve, and that to fulfill our mission we must be a strong vital force in the civic and industrial welfare of those communities. The broad conception that real success can come only through service has become our creed, and we ask frankly for your co-operation and goodwill in the carrying out of our work.

In the following issues we are printing a few talks which have appeared in the papers published in the territories which we serve, and in which some of the phases of Tenney Service are informally discussed. We hope that you will read them through, and that, if you happen to be one of those who in the past looked with suspicion and distrust on anyone engaged in public service work, you will go away with a different insight into the work which we are trying to do.

1. *Reliability.*—Recently an accident happened to a piece of apparatus at our plant, which, to most plants, would have been a very serious matter. In the case mentioned, however, it was simply necessary to turn a valve and throw into operation another piece of machinery, carried in duplicate by this Company, to provide for just this improbable contingency. We believe that service to be good service must be reliable, and the foregoing illustrates the importance of taking every precaution to insure reliability.

To guard against occasional breaks of machinery, every possible piece of apparatus at our plant is carried in duplicate, ready to operate at a moment's notice. Our distribution system is being constantly patrolled, and kept in the highest state of efficiency, so that the possibility of interruptions from any source is reduced to a minimum. In addition we have on duty day-and-night a force of trained men ready to respond immediately to any emergency call that may come in. All this costs thousands of dollars in the course of a year, and the money thus spent to guard against interruptions yields no return dividends, but it enables us to maintain Tenney Service at the very highest standard of efficiency.

2. *Availability.*—Our service is available to everyone who is located in a district which offers the slightest possibility of returns for the necessary investment involved in extending our lines. We want to place our service at the disposal of the greatest possible number, and gladly spend money on extensions even where they will not prove profitable for many years.

This is a part of our policy of building for the future, and it is a policy which has played an important part in the city's growth.

THE HOME THAT IS PIPED FOR GAS OR WIRED FOR ELECTRICITY IS WORTH MORE TO ITS OWNER AND WORTH MORE TO THE CITY.

3. *Courtesy.*—The careful manufacturer keeps a close watch upon what is termed "Friction Losses." No piece of machinery can be operated without friction, but it is the aim of the skilled engineer to reduce the friction to a minimum.

Uniform courtesy to all will do more to minimize friction in business than any other thing, if it is backed up by a fair and honest policy. This is the policy we aim to carry out through every branch of our organization, and as a result you will find our representatives courteous and painstaking to the last degree, whether the matter for which you need their service is of great or small importance. If you will notify us of any inattention or lack of courtesy on the part of any one of our employees, you will confer a favor both on the employee and ourselves, for you will help to make a better man of him.

4. *Co-Operation.*—At a recent meeting of the National Civic Federation, which includes among the members of its Executive Committee such illustrious names as those of President Taft, Elihu Root, Andrew Carnegie, Archbishop Ireland, George B. Cortelyou, Samuel Gompers, etc., it was the sense of the Federation that nine-tenths of all industrial troubles are the direct result of misunderstandings.

We believe that this is true, and we are building every day for a closer and more intimate co-operation between our employees and various departments, to the end that the public service may never suffer through lack of harmony in our organization.

Similarly, we want to co operate with you to the fullest extent in the way of learning and correcting any causes of dissatisfaction with our service which may exist, for without a spirit of friendly harmony between this Company and its customers we can never attain that ideal real public service which is the aim of Tenney Service everywhere.

5. *Quality.*—One phase of modern life that is realized by every merchant is the fact that the public is no longer satisfied with the more or less haphazard service of former years. People have been educated to the point where they expect and demand their wants be filled promptly and intelligently, and the merchant whose service does not come up to this standard soon drops behind in the race for public approval and patronage.

Real success in any line of endeavor, great or small, must have for its foundation the rendition of real service. We are building for permanent success on a foundation of the best and most liberal public service of which we are capable. This doesn't mean the old-fashioned, easy-going, "as-soon-as-convenient" service. It means the modern, up-to-the minute, whenever-you-want it, wherever-you-want-it kind. A telephone call will convince you of the unique effectiveness of the service which we are furnishing to our customers.

6. *Responsiveness.*—We might have an army of the best trained men in the world, but that wouldn't do any good if you couldn't get the benefit of their services when you needed them.

As a matter of fact, we have a force of the best equipped representatives to be found anywhere. Each one is carefully selected for the work which he has to do, and has been trained to do this work for you, as we know it should be done. His service is at your disposal every minute of every day and night. If there is anything wrong with your service, and you will tell us about it, we believe that you would be impressed with the prompt and effective response to all.

7. *Confidence.*—When you come into our office and tell us something about our service we believe you are speaking the truth. On the strength of your word we proceed to spend our money in an effort to right what you tell us is wrong. Usually the expense to us is considerably greater than the amount involved in your complaint, because we believe in thoroughness in matters of public service.

We have confidence in you. We believe that you are fair, and that you propose to treat us fairly in accordance with the extent to which we measure up the standard of good public service.

We want you to have confidence in us. In these "talks" we have told you frankly what we are trying to do. We have tried to bring out the fundamental fact that it is through service we hope to succeed, because we believe that through service lies the only road to real and permanent success. There lies our road. With your cooperation we shall give our best to the future of this community and to the Company whose real interests are inseparable from its growth and prosperity.

Petroleum Industry, 1912.

"Press Bulletin, No. 91," United States Geological Survey, contains some interesting statistics gathered by Mr. George O. Smith, Director of the Survey, respecting the petroleum history of 1912:

There was no considerable change in the quantity of petroleum produced in the United States in 1912, compared with 1911. Nevertheless, according to David T. Day, of the United States Geological Survey, the year was as full of remarkable incidents as is usual in the history of this article of commerce, which depends for its statistical position more upon the chances of new discoveries, and less upon trade demands, than any other commodity except gold.

As a rule, the Eastern fields declined in production, because it was impossible to keep up the great output of 1911 without large additional discoveries of new pools in the older fields. The Eastern decline was, however, offset by the increase in California, where the San Joaquin Valley fields (Midway, McKittrick, Maricopa, etc.), are still at the height of the gusher stage. An estimate of the production in 1912, and a comparison with the product in 1911, is given below:

Production of Petroleum in the United States in 1911 *and Estimated Production for* 1912.—*Barrels of* 42 *Gallons.*

State.	1911.	1912.
California	81,134,391	87,000,000
Oklahoma	56,069,637	52,000,000
Illinois	31,317,038	28,000,000
Louisiana	10,720,420	10,000,000
West Virginia	9,795,464	11,800,000
Texas	9,526,474	10,500,000
Ohio	8,817,112	8,500,000
Pennsylvania	8,248,158	8,000,000
Indiana	1,695,289	1,200,000
Kansas	1,278,819	1,300,000
New York	952,515	700,000
Kentucky	472,458	500,000
Colorado	226,926	200,000
Other States	194,690	500,000
	220,449,391	220,200,000

It will take much time to calculate the amount of oil sold at the different prices of the year, but it is evident that the total value of the product increased markedly, being about $150,000,000 compared with $134,144,752 in 1911.

Stocks.—In all the fields except those of California and the Gulf there was a steady drain on stocks during the year, so that from a total of 81,789,390 barrels—over a half year's output—on January 1, the stock declined to 69,000,000 barrels at the end of the year. This drain reflects the increased capacity of the refining plants of the United States, the greatly increased exports, and a gradual change in the general condition of the industry by which gasoline has become much more in demand, so that the trade is well satisfied with heavier grades of gasoline or naphtha. For this reason the dividing line between naphtha and kerosene has necessarily been drawn nearer to kerosene, and a large quantity of oil has been distilled into the gasoline portion of the products and a less output of kerosene resulted. On the other hand, the heavy residues, which are marketed as fuel oils, have come into greater demand, and, owing to the ever-evident effort to increase the yield of light products by splitting up these residues the supply of fuel oil has not kept up with the demand. The advent of internal-combustion engines, such as those of the Diesel type, promises still higher prices for fuel oils. The United States has been slow in the adoption of these new engines, but their general adoption abroad has pointed the way to rapid increase in their use here.

Prices.—The general decline in production, except in California, would doubtless have been much greater, but for the effort to apply laws of supply and demand by increases in prices. Prices advanced so greatly during the year as to stimulate drilling, even in the old New York and Pennsylvania pools, and so checked the decline. Formerly this plan has not been so successful. In the mid-Continent field also it checked the decline, so that the product will come within 4,000,000 barrels of the maximum output (in 1910). In the Appalachian field, where higher prices and very cheap methods of pumping oil will make the decline slow in any event, the great rise in price from $1.30 to $2 a barrel seems to have checked the normal decline and even to have effected an increase, which, though slight, was gratifying.

At the beginning and end of 1912 the prices of various oils were as follows:

Prices of Petroleum in the United States at the Beginning and the Close of 1912.

Kind of Oil.	Price per Barrel. Beginning of 1912.	Close of 1912.
Pennsylvania grade	$1.30	$2.00
Cabell, Pa	.94	1.60
Mercer, Pa., black	.87	1.53
New Castle, Pa	.84	1.53
Corning, Pa	.77	1.53
Wooster, O	...	1.53
North Lima, O	.84	1.22
South Lima, O	.79	1.17
Indiana	.79	1.17
Princeton, Ind	.67	1.05
Somerset, Ky., 32° B. and over	.74	1.15
Ragland, Ky	.45	.65
Illinois, 30° B. and over	.67	1.05
Illinois, under 30° B	.57	1.02
Kansas and Oklahoma	.50	.80
Corsicana, Tex., light	.53	.85
Corsicana, Tex., heavy	.53	.70
Electra, Tex	.53	.85
Henrietta, Tex	.53	.85
Caddo, La., 38° B. and over	.62	.88
Caddo, La., heavy	.40	.60
Humble, Tex	.65	.75
Saratoga, Tex	.65	.75
Sour Lake, Tex	.65	.75
Spindletop, Tex	.70	.80
Batson, Tex	.65	.75
California:		
Coalinga, light	.60	.65
Coalinga, heavy	.30	.35
Kern county, light	.60	.65
Kern county, heavy	.30	.35
Santa Maria, light	.70	.70
Santa Maria, heavy	.40	.40
Los Angeles, light	1.00	1.00
Los Angeles, heavy	.70	.70
Fullerton and Whittier, light	1.00	1.00
Fullerton and Whittier, heavy	.70	.70
Canadian oil	1.24	1.59

Drilling Activity.—In the Appalachian fields in 1911 the highest number of wells drilled in any one month was slightly over 300, whereas in 1912 the figure of 300 wells a month was reached in April, and the monthly number did not go below 300 during the rest of the year, reaching a maximum of 450 wells in September. The rate of drilling was increasing at the end of the year instead of showing the usual decline due to bad weather.

Decline Abroad.—Another feature tending to strengthen the position of oil in this country is the decrease in production in Russia, from 66,183,691 barrels in 1911 to about 60,000,000 barrels in 1912. Roumania increased its product slightly, but not sufficiently to offset the Russian decline. The chief decrease was in the old Baku field. The world's consumption of oil, according to Mr. Day, is now about a million barrels a day, the United States furnishing more than all other countries.

Report of Committee on Thermal Value and Candle Power.

[Prepared for the Seventh Meeting, American Gas Institute.]

The original appointment of the Committee on Thermal Value and Candle Power was made, in 1910, by Mr. W. Cullen Morris, then Chairman of the Technical Committee, whose instructions to the Committee were to consider:

1st. The benefit to be derived by the adoption of a thermal value standard to the consumer and to the operating company.

2d. What limitations would be found to be involved in the operation of a gas plant in maintaining a constant thermal value to the gas?

3d. The stability of a gas made to a thermal standard as compared to a gas made to a candle power standard.

4th. The effect of atmospheric conditions in the measurement of the thermal value of a gas.

Report of Empire State Joint Committee.—Almost coincident with the appointment of this Committee, February 1, 1910, a conference was held in Albany, N. Y., at which there were invited to appear, before the Public Service Commission for the Second District of New York, representatives of the gas companies in the State, gas engineers and experts from elsewhere, including representatives appointed by the President of the American Gas Institute, and a representative of the United States government from Washington, to discuss the relative values of illuminating and heating standards for the gas supplied in the Second District. At that meeting a joint committee, under whose immediate charge and direction, subject to the approval of the Commission, the inquiry should be concluded, was formed from the Empire State Gas Association, and representatives appointed by the Commission, these representatives being the Commission's engineers, to make a careful investigation on the necessity for a calorimetric standard, and finally report to the Commission, who would then endeavor to have such changes made in the legislation of the State regarding gas inspections as would conform to their knowledge as influenced by the findings of this Committee.

This Committee has had frequent meetings. It has kept itself informed regarding the best modern thought on the subject and has instituted in some 15 gas companies in the State daily parallel readings of candle power and heating values, extending over at least one whole year, using the most approved instruments and methods known to modern practice and taking cognizance of the various details of gas operation that would have a bearing on the subject. Your Committee desires now to acknowledge the courteous invitation extended to it to be present at the meeting of the Empire State Joint Committee, of which it has availed itself. The "Plan of Calorimetric Investigation and Explanation of Test and Report Forms" has been printed in pamphlet form, and probably can be had in limited numbers by the members of this Institute, on application to the Empire State Gas and Electric Association, 29 West 39th street, New York City.

It needs no argument to show that such a report, involving perhaps a radical change in the gas works' operation throughout the largest State in the country, based on data obtained from trained observers in 15 gas plants and, on the programme arranged by the Commission, would be conducted on a more comprehensive plan and at greater expense than could be hoped to be undertaken by such a Committee of the American Gas Institute. Your Committee, therefore, believes that it can serve the Institute no better than to refer them to the report of the Empire State Committee, which will be made public within the next year.

Bureau of Standards, Discussion of Heating Values.—During the last year the question of rating by which the calorific values of gases shall be compared one with another has been reopened, principally through an address delivered by Dr. E. B. Rosa, of the Bureau of Standards, at the Franklin Institute in Philadelphia during the celebration of the centenary of gas lighting. Dr. Rosa has made a clear and concise statement which appears to have been somewhat misinterpreted by members of the Institute. Dr. Rosa has enumerated 3 classifications of the calorific value of gases:

1. The total heating value, which is the total heating effect that is produced by the combustion of the gas. This heating effect can be "Measured by the calorimeter per unit quantity of gas burned if the air (admitted to the calorimeter at room temperature) is dry, and if the water vapor formed by combustion is all condensed in the calorimeter, and both it and the products of combustion escape at room temperature. In other words, when gas is burned in dry air at room temperature, and the total products of combustion are cooled to room temperature, and all water vapor formed is condensed to water, the total heat given up in the process is called the *total heat*."

2. The gross heating value, which is the value determined by the calorimeter and to which Dr. Rosa objects because such determination is influenced by extraneous conditions not inherent in the quality of the gas itself, such as temperature and quantity of water vapor in the incoming air and outgoing products of combustion, and the quantity of air used in the combustion.

3. Is the net heating value, which Dr. Rosa defines as the "Gross heating value minus the heat of condensation at room temperature of the water deposited in the calorimeter and collected outside per unit of gas burned."

Also, the "net heating value is the total heating value (as defined above) minus the latent heat of all the water vapor produced by combustion."

Both the total heat and the net heat, he states, are independent of the amount of water vapor entering the calorimeter with the incoming air current or of the quantity of water vapor leaving with the products of combustion. This is to say, they are independent of the quantity and temperature of the air entering the calorimeter and of the atmospheric humidity, but depend only on the quality of the gas burned.

Dr. Rosa argues, therefore, that since the gross heating value does not depend solely on the quality of the gas burned and the total heating value cannot be determined by the ordinary flow calorimeter, and the net heating value does depend solely on the quality of the gas burned and can be determined accurately by the flow calorimeter, in comparing the calorific value of one gas against that of another, it should be by means of their net heating values.

Your Committee believes that the members of the Institute will not widely disagree with Dr. Rosa in his premises or mathematical deductions, but, for practical reasons resulting from years of experience, will be reluctant to accept the net heating value as a standard of the quality of gaseous fuel, for the reasons:

1. Gaseous fuels should be classified according to their total heating value.

2. There is and can be no fixed relation between the total heating value and the net heating values of gaseous fuels.

Two gases may have total heating values and unequal net heating values, just as two gases may have unequal total heating values and equal net heating values. To illustrate, hydrogen has a total value of 326.2 B.T.U's per cubic foot and carbon 323.5 B.T.U's. Hydrogen burns entirely to water, and since, by Dr. Rosa's statement,

$$H = T - B$$

in which B is the latent heat contained in the mass of water vapor formed by the combustion of unit quantity of gas, it follows that the net heating value of hydrogen, which burns entirely to water, must be B less than that of carbon monoxide that produces no water from combustion, hence has its total heating value equal its net heating value.

Your Committee believes the Institute will prefer to retain its definition of the heating value of gas as adopted by the Institute at its annual meeting in 1908, set forth in the "Proceedings" for that year, page 383:

"The heating value of a gas is the total heating effect produced by the complete combustion of a unit volume of the gas, measured at a temperature of 60° F., and a pressure of 30 inches of mercury, with air of the same temperature and pressure, the products of combustion also being brought to this temperature.

"In America the unit-volume is a cubic foot and we recommend that the heating value be stated in the terms of British thermal units per cubic foot of gas."

How far the variance between the total heating value and gross heating value, as determined by the modern flow calorimeter, approved by the Institute's Committee on Calorimetry and when operated under rules and observing the precautions set down by the Committee, will extend, can be determined by a perusal of the reports of that Committee; but we earnestly recommend to our Committee on Calorimetry, the Bureau of Standards at Washington, and others, the necessity of devising a calorimeter that will permit of the tota

(*Continued on page* 50.)

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NOTICE TO ADVERTISERS.

New Advertisements and changes of copy therefor should be in hand Wednesday noon of week prior to date of issue.

NEW YORK, MONDAY, JANUARY 20, 1913.

[Official Notice.]

Forty-third Meeting, New England Association of Gas Engineers.

New England Association of Gas Engineers.
Office of the Secretary,
January 9th, 1913.

To the Members, New England Association of Gas Engineers: The Forty-third Annual Meeting of the New England Association of Gas Engineers will be held at Youngs' Hotel, Boston, on Wednesday and Thursday, February 19 and 20, 1913.

Papers on "Accounting," by Mr. F. P. Royce; on "Gas Coal and Coal Gas," by Mr. Edward F. Wilson; on "Electrolysis," by Prof. A. F. Ganz; and "Gas Lighting," by Mr. R. F. Pierce, are promised.

Applications for membership should be sent to the Secretary before February 18th.

The sessions will begin promptly, as the subjects call for extended discussion.

Members will dine together Wednesday evening.

All friends of the Association are cordially invited to attend the meeting.

N. W. Gifford, Secretary.

[Official Notice.]

Annual Meeting, Efficiency Society.

The Annual Meeting of the Efficiency Society will be held, January 27 and 28, at 29 West 39th street, New York city. Five business sessions have been arranged for, and many phases of efficiency work will be discussed by the members. Those desirous of attending should communicate with the Secretary.

Very truly yours, H. F. J. Porter, Secretary.

[Official Notice.]

Fourteenth Meeting, the "Gas Meeters."

Office of the Secretary,
New York, January 15, 1913.

The fourteenth meeting of the "Gas Meeters," New York Section, will be held at Kalil's restaurant, 14 Park Place, New York, the evening of Thursday, January 30, at 6 o'clock.

Dr. Arthur H. Elliott, consulting engineer, author and lecturer, will deliver an address on "Heat Units, Candle Power and Pressure." The usual dinner will be served at $2 per plate.

Very truly yours, H. Thurston Owens, Sec'y.

BRIEFLY TOLD.

British Gas Associations.—One very striking feature of the British Gas Associations, as published in the *Gas World* "Year Book" for 1913, is in great contrast with those in this country. The greater number of American Associations hold only one meeting a year, while of the 21 British Associations listed only 4 are content with a yearly gathering. The number of sessions held by each is as follows: Four having meetings annually; five having two meetings; five having three; two having four; and five having six or more. While the frequency may, of course, be overdone, as has been the experience in one of our lighting associations here, the change from one to three meetings a year has greatly increased the interest and attendance in the instance of the New Jersey State Gas Association; wherefore other organizations might find it worth while to investigate its methods.

Illuminating Engineering Society, Annual Meeting.—The 7th annual dinner of the Illuminating Engineering Society was like its predecessors in many respects. It was held in New York. It was formal; also optimistic. The place was moved uptown to the Aldine Club, and the cost was moved up also—progressive movements, do we hear it said? Nearly 100 members from differing sections of the country first enjoyed a well served dinner, and then listened with interest, punctuated by enthusiasm, to the short addresses of the several speakers. President Lansingh, after sketching briefly the activities of the Society, called upon Mr. Walter R. Addicks who, in responding on behalf of the American Gas Institute, assured the Society of the Institute's wish for co operation. Mr. J. W. Lieb, Jr., speaking for the Association of Edison Illuminating Companies, followed in like vein. Dr. A. E. Kennelly, of Harvard University, traced the need for some of the work as far back as the protoplasm, while Mr. T. C. Martin, Secretary of the National Electric Light Association, kept closer to the developments of the day. Dr. W. H. Tolman, Director of the Museum of Safety, stated that the new building of the Museum would include an exhibit that was to be arranged and supervised by a committee from the Society. Dr. C. H. Sharp and Mr. L. B. Marks, both Past-Presidents, reminisced and prophesied as befitted their experience, and then the more serious—or, rather, the equally serious but more essential—task of the evening came in the report of the Council to the Society, which was read in abstract by President Lansingh. An increase in the activities and a decrease in the surplus were the features of a report which contained considerable data, and over which considerable time had been spent for its preparation. The voting having been done by mail, the tellers reported through Chairman Law that the following regular ticket had been duly elected:

President.—Preston S. Millar.
Vice-President (Philadelphia Section).—W. J. Serrill.
Vice-President (New England Section).—J. W. Cowles.
Vice-President (Chicago Section).—J. R. Cravath.
Vice-President (Pittsburgh Section).—H. S. Evans.
General Secretary.—J. D. Israel.
Treasurer.—L. B. Marks.
Directors.—C. O. Bond, P. W. Cobb and W. Cullen Morris.

President-elect Millar, who served as Secretary so ably for several years, received a hearty ovation, whereupon he proceeded to lay forth a plan which, for breadth and effectiveness, has not been exceeded. Educational work in its broadest sense is to be the watchword in what promises to be a business-like admin istration. After a few words of appreciation from Secretary-elect Israel, the meeting adjourned. Among those present, in addition to the speakers, were Drs. A. H. Elliott and H. E. Ives, and Messrs. J. W. Young, A. J. Rowland, R. C. Ware, O. H. Fogg and G. S. Barrows.

"Gas Meeters," Philadelphia Section, Second Meeting.—Philadelphia has again proven that it is a sure-enough, *bona fide* gas town, if attendance there at gas meetings be the criterion. At the second meeting of the Philadelphia Section of the "Gas Meeters" well over four score gathered at Kugler's restaurant, 1412 Chestnut street, on Saturday evening, January 11th. Chairman Dutton called "attention," whereupon the gathering, attuned by Director Ehrenzeller and his orchestra, sang "America." The dinner, which might have been termed a banquet, to judge from the quality as well as the quantity of the food and other "refreshers," was interspersed with songs from the members, including a solo number in fine baritone, by Mr. L. B. Barrett, who hails from the Camden division of the New Jersey Public Service Company. Following the dinner, Mr. C. W. Hare, Presi-

dent of the National Commercial Gas Association, spoke on the "Outlook for 1913," and if the enthusiasm with which his remarks were received indicates the spirit of 1913, it surely will be a big year. Mr. I. W. Peffly, first Chairman of the New York Section, followed, and told of the work of the Association, its growth and the place and plane it hoped to occupy in the industry. Mr. H. Thurston Owens then offered a short amendment to the Constitution, which provides for a general governing body for all the sections, which was passed without discussion. The most important message came from an outsider, Mr. Lawrence Visscher Boyd, Chairman of the Philadelphia Chapter of the American Institute of Architects. His plea was that more data and information be placed in the hands of the architects, and that greater co-operation be had between the companies and men of his profession. He cited the fact that an architect covered no less than 27 trades; and, in view of the remarkable developments in methods and appliances in recent years, assistance was much desired. The speakers who followed, discussed these matters in a informal manner, and the singing intermissions did not detract from the interest and certainly seemed a welcome innovation between gaps in the discussion of the serious matters under consideration. Among those present were Messrs. Stanley Grady, H. P. Dains, H. H. Ganser, C. W. Wardell, F. J. Rutledge, T. R. Elcock, Jr., S. J. Franklin, F. D. Moses, A. Mason, J. B. Myers, Geo. Steele, J. Weaver Smith, Geo. W. Thomson, Hugh C. Aiken, C. O. Bond, R. F. Pierce and C. W. Hoy. The February meeting is to include an inspection of the well-equipped gas meter factory and shops of Messrs. John J. Griffin & Company; following which an address will be delivered by Mr. J. J. Gribbel, President of the named corporation.

CURRENT MENTION—

THE next meeting place of the American Gas Institute, as defined last week by the Committee having the naming in charge, will be Richmond, Va.

MR. SAMUEL K. CAMPBELL has resigned engineering charge of the Nassau and Suffolk Lighting Company, of Hempstead and Freeport, Long Island. Mr. Campbell had charge of this work when the McDonald syndicate was in a quandary over its future; and it is largely (if not chiefly) due to Mr. Campbell's painstaking direction that the Company's present condition is due.

SOME days ago, Mr. K. M. Mitchell, General Manager of the St. Joseph (Mo.) Gas Company, was advised by the owners of that corporation (The American Light and Traction Company, of New York) to fix the selling schedule for natural gas at 65 cents (gross) and 60 cents (net) per 1,000 cubic feet, the same to become effective immediately on the official announcing of the order of Judge Pollock, of the Federal Court, granting a schedule of advanced rates to the distributing companies.

LAST week in looking over an old album containing the photographs of several men prominent in the gas business two score years ago, one photograph recalled some interesting happenings. The picture was that of Major R. R. Swepson, who at the time the photograph was taken (1874) was President of the Knoxville (Tenn.) Gas Company. The Major (he was also indifferently titled "Col.") was, to say the least, a most peculiar man. To look him over, and to attempt to gauge his standing, by such a visual process, would indeed lead one far astray. As he appeared, dressed in a well-worn suit (semi-Prince Albert coat, tight fitting trousers, low vest, a high rolling collar, and flowing black tie) one would not consider him as actually one of the wealthiest men in beautiful Tennessee. However, such he was, and no other name was better known in cotton marts the world over than his. He was not a planter; but he was a "ginner" and a "factor" of great degree, and was always a great supporter of anything tending to benefit the Southern States. This reminiscence arises through advices from a correspondent who spent the Christmas holidays in Knoxville, and who informs us that he was in the city when Mr. William R. Hicks, Assistant Superintendent of the Knoxville Gas Company, was celebrating the 36th anniversary of his service thereto. Major Swepson was the man who employed him in 1877 to act as office boy, and his course since then has enabled him to gradually better his position, no matter what the changes in control of the corporation may have been.

"THE Boneo Club," of the Wilmington (Del.) Gas Company, enjoyed its annual dinner this year in the Hotel Gillespie, the evening of the 10th inst. To say it was a most enjoyable happening is to tell the truth, both in respect of the menu and the speechmaking. The Committee in charge of the festivities (Messrs. E. A. Griffith and W. P. McCracken) well deserved the words of commendation that were plentifully spoken respecting their capacity as framers of interesting entertainment. I believe that hereafter these dinners will be served semi-annually.—B. A.

THE January meeting of that excellent body, "The American Society of Mechanical Engineers," which was held in the Engineering Societies' Building, 29 West 39th street, the evening of the 14th inst., was more than ordinarily interesting. Mr. Calvin, Chairman of the Committee on Meetings in New York during 1912, gave an extended and interesting report of such activities. His statement shows how well the members think and act for their Mater. The paper for the evening was contributed by Mr. F. A. Waldron, perhaps the leading Industrial Engineer of America, whose splendid presentation of several phases of scientific management, not closely related to labor problems, led to an animated discussion. An informal dinner preceded the session.

THE "Conservation Commission," State of New York, possibly in a desperate attempt to make some sort of defense or excuse or palliation for existence, has issued a "scarelet" under the caption of "Cheap Electricity for All." The form is of the question-and-answer type. The queries and replies led the Municipal Ownership Publishing Company to prepare a rejoinder thereto, and that has been distributed as a supplement to the Company's Jannary issue of its diminutive magazine, the title of which is "Concerning Municipal Ownership." Those having municipal ownership agitators "in their midst" should see to it that each one of them is furnished with a copy of the aforesaid issue.

THE new plant to be erected this year by the Montreal Light, Heat and Power Company, in the Cote St. Paul District, will be up to a daily output of 12 millions cubic feet, and will cost well up to $2,000,000.

THE hearing in the suit of Mr. Thomas L. Hume for the appointment of a receiver for 3,520 shares of the Georgetown (D. C.) Gas Light Company, standing on the transfer books in the name of the Washington (D. C.) Gas Light Company, will be had the 23d inst. Plaintiff seeks to have the stock distributed pro rata amongst the stockholders of the Washington Gas Light Company, on the ground that the shares were purchased with monies belonging to the latter corporation.

Book Reviews.

"*Directory of British Gas Companies.*"—The *Gas World's* "Year Book and Directory for 1913" contains the usual diary and handy tables, in addition to the list of "Undertakings." A summary of the 1912 statistics, covering Great Britain, is as follows:

Number of undertakings	1,620
Annual make (cubic feet)	210,493,343,000
Number of consumers	7,143,748
Number of public lamps	769,210

The much larger output, in a country with less than one-half the population of the United States, might perhaps be due to the oft-repeated excuse of local conditions, but the fact that the number of gas street lamps outnumbers those in this country 3 to 1 is a matter which should cause managers of gas properties to do more than ponder over. However, in such reckoning it is impossible to pit one country against another with the respective populatings as the basis All that is necessary to prove this, if any other proof than an *ipse dixit* were required, is to mentally picture the State of Texas in the United States and compare the same with the area of the United Kingdom.

Publications.

[All Publications, Catalogues, etc., mentioned below, are kept in our office for the convenience of our patrons.]

"*Lighting Abstracts.*"—The Physical Laboratory of the National Electric Lamp Association, which was organized in 1908, has made a large number of investigations, 28 of which are presented in abstract in the first "Abstract Bulletin" of the Laboratory. Each of the investigations has been abstracted by the authors, and this offers a most excellent example for authors to follow when presenting papers before association meetings. The mental thought represented by these abstracts stands for a great expenditure of time in analyses, which surely reflects much credit upon the authors, and the Association, too. The Director (Dr. E. P. Hyde) is a Past-President of the Illuminating Engineering Society, and is Chairman of the International Photometric Commission of the American Gas Institute.

"*Washington Public Service Commission Report,*" 1912.—They "do" things out West. The first report of operations during 1912 received from any Public Service body this year, comes from Olympia, Washington. It contains 365 pages of matter, and practically no statistics. The reason for the latter omission is thus given: "Such data merely encumbers the report, and serves no useful or practical purpose."

"*Southwestern Electrical and Gas Association,*" 1911.—The "Proceedings" of the Seventh Annual Convention of the above named Association, which was held in Houston, Tex., April, 1911, are now available for members in book form. The Question Box, which is included, requires nearly 100 pages for the presentation of the queries and the replies thereto. We are advised that the 1912 "Proceedings" will be issued shortly.

"*Rate Establishment.*"—Another part of the 16 on "Analysis of Public Utility Regulation," being prepared by the Department on Regulation of Utilities, National Civic Federation. Suggestions and criticisms are invited, and anyone interested should be sure to obtain copies.

"*Photometers.*"—The Reichsanstalt Precision Photometer and accessories are illustrated and described in Catalogue 60 of the Leeds & Northrup Company.

(*Continued from page 47.*)

heating value of a gas to be determined to a close approximation to accuracy by observations on an instrument that can be used under the same general conditions that now obtain with the use of the present flow calorimeter, if it be found that such determinations can not be made on the present approved type of calorimeters.

Your Committee recommends to the officers of the Institute for the ensuing year that a Committee be appointed to confer with the Bureau of Standards on this subject of classification of qualities of gas through their heating values. We recognize the great desirability of being in agreement with the Bureau of Standards on this important subject before the issuance of further bulletins by them and have taken the liberty of adding as an appendix to this report the argument made by Dr. Rosa in his Franklin Institute lecture on the measurement of the heating value of a gas.

Required Heating Values.—Your Committee desires to call attention to the belief prevalent in this country, if we are to judge by the standards already adopted by State Commissions and municipalities, as to the permitted heating values of gaseous fuel, that it is wise to adopt a heating value excluding all but the highest grades of manufactured gas as well as natural gas. This is opposed to the modern view of the necessity for conservation of energy—this uneconomical and wasteful method of excluding that large volume of gas capable of being manufactured which falls just short of these higher standards. We desire to call the attention of the Institute to the fact that this belief in the necessity of the highest standards is not shared in by the authorities abroad who fix the standards for the larger gas companies.

In London at least one company is now required to substitute for illuminating power standard a calorific standard of 540 B. T. U.'s gross, with liability to penalty only on a lapse to below 475 B. T. U.'s gross.

In Paris a net heating value of 522 B. T. U.'s is required and the Budget Committee in 1911 recommended candle power requirements be abolished.

In Berlin, the Corporation Undertaking, a municipal plant, is observing recommendations of German chemists that the gas supplied should have a gross calorific power equal to 543 B. T. U.'s, not to fall below 522 B. T. U.'s per cubic foot.

In Buenos Ayres, Argentina, a recent new franchise granted the Company requires a net heating value of 539.4 B.T.U.

W. H. Gartley, Chairman,
Dr. A. C. Humphreys,
Dr. A. H. Elliott,
R. M. Searle,
J. B. Klumpp,
J. F. Wing.

Extract from Address of Edward B. Rosa, Ph.D., Chief Physicist, Bureau of Standards, Washington, D. C., on "The Use of Gas for Heat and Power: The Testing of Gas," Delivered in the Hall of the Franklin Institute, Philadelphia, During the Celebration of the Centenary of the Introduction of Gas as an Illuminant.

The Measurement of the Heating Value of a Gas.—Gas is used for the production of heat, light and power. For heat and power, and largely for lighting as well, its value is determined by the amount of energy it contains, and by its condition as respects pressure and purity. It's energy is measured by burning samples of gas in a calorimeter. For this purpose, several different forms of instruments are available. The able Committee on Calorimetry of the American Gas Institute has done very valuable work in testing different forms of calorimeters, and in showing how they may be used in giving reliable results. The Bureau of Standards has also been making a thorough experimental study of gas calorimeters, the results of which will be published in the Bulletin of the Bureau. The results of this work will enable still higher accuracy to be obtained in calorimetric work.

The Gross and Net Heat.—A gas calorimeter is an instrument for measuring the heat of combustion of a gas. In the usual type of instrument, the gas to be burned and the air to support combustion are admitted to the calorimeter at room temperature, while the products of combustion are cooled substantially to room temperature before escaping, these products all being gaseous, except that a certain amount of water vapor is condensed and collected as water at room temperature. The heat measured by the calorimeters under these conditions is called the *gross* heating value of the gas.

If the heat of condensation at room temperature of the water vapor condensed and collected is subtracted from the gross heating value, the remainder is called the *net* heating value. Usually the gross heating value is specified in city ordinances and in rules of the State Commissions (where a calorimetric test is required), and it is commonly believed (though erroneously) that it can be as accurately measured as the net value. As there is some confusion on this point, and as the measurement of the heat of combustion of gas is a very fundamental problem, I may be permitted to discuss the question rather fully.

Let a = mass of water vapor *admitted* to the calorimeter (per unit quantity of gas burned) in the incoming current of air.
b = mass of water vapor *formed* by the combustion of unit quantity of gas.
c = mass of water vapor *escaping* (per unit of gas burned) with the products of combustion.
d = mass of water vapor *condensed* in the calorimeter and collected outside.
Let A = latent heat contained in "a."
B = latent heat contained in "b."
C = latent heat contained in "c."
D = heat of condensation at room temperature of "d."

The Total Heat.—We will define the *total* heat T as the amount of heat measured by the calorimeter per unit quantity of gas burned if the air (admitted to the calorimeter at room temperature) is dry and if the water vapor formed by combustion is all condensed in the calorimeter, and both it and the products of combustion escape at room temperature. In other words, when gas is burned in dry air at room temperature, and the total products of combustion are cooled to room temperature, and all water vapor formed is condensed to water, the total heat given up in the process is called the *total heat.* Then, under these circumstances,

$$a = o$$
$$c = o$$
$$b = d$$

and the heat measured by the calorimeter is the total heat, T. This would be the value found if the measurement were made with a bomb calorimeter. This is a larger quantity than the *gross heat* defined above, due to the fact that usually more uncondensed water vapor escapes from the calorimeter than enters with the incoming air. If the products of combustion carry away water vapor of mass "c" and the latent heat C, the heat measured will be T — C. If the air entering contains water vapor of mass "a" and latent heat A, then the heat measured will be T — C + A. But this is defined to be the *gross heating* value, G. Hence,

$$G = T - C + A.$$

The net heating value N is the gross minus the heat of condensation D of the water deposited per unit of gas burned, d. Hence,

$$N = G - D = T - C + A - D$$
$$= T - (C + D - A).$$

But since $a + b = c + d$
and $A + B = C + D$
$C + D - A = B$
and, therefore, $N = T - B.$
$N = T - B.$

That is, the net heating value of a gas is the total heating value (as defined above) minus the latent heat of all the water vapor *produced by combustion.* Both the *total heat* and the *net heat* are independent of the amount of water vapor entering the calorimeter with the incoming air current or of the quantity of water vapor leaving with the products of combustion. That is to say, they are independent of the quantity and temperature of the air entering the calorimeter and of the atmospheric humidity, but depend only on the quality of the gas burned. The gross heat, on the contrary, varies with "a," being a maximum when the atmosphere is saturated, and a minimum when it is dry. It also varies with "c," being larger as "c" is smaller, and *vice versa.* That is, the gross value varies with the atmospheric humidity and with the quantity and temperature of the gaseous products leaving the calorimeter. If the air enters dry and is great enough in quantity to carry away all the moisture produced by the flame, so that $d = o$, then the gross and net values are equal. If the air enters saturated, $a = c$ and $b = d$, the total and gross values are equal.

Gross Heat Affected by Atmospheric Conditions.—Hence we see that the *total heat* and the *net heat* depend only on the gas itself and

are wholly independent of the condition of the atmosphere and of the quantity of air passing through the calorimeter (if there is enough air to insure perfect combustion). The *gross heat*, however, is a variable quantity, depending on both these factors as well as upon the gas itself. If, for example, a certain gas has a total heat of 600 B.T.U. and a net heat of 550 B.T.U , the gross heat as measured by a calorimeter may be anywhere from 550 to 600 (or may be outside these limits in extreme cases), according to the temperature and the atmospheric humidity at the time of the measurement and the quantity of air passing through the calorimeter.

It will be seen from the above that the net heating value is a truer measure of the quality of the gas than the gross. It is the gross value, however, which is used generally as a test of the quality of the gas. Hence, even if the calorimetric work be correct to within 1 per cent. (and the net heat determined within 1 per cent.) the result may be in error by several per cent. if the gross value is used. Since the object of the work is to test the quality of the gas, the result should, of course, be independent of the state of the weather.

The effect of atmospheric moisture upon the light of a gas flame is even greater than its effect upon the results of a calorimetric measurement, but this effect is substantially eliminated in photometric testing if a flame standard is employed. The candle power of a flame is greater in a drier atmosphere, being about 10 per cent. greater for a pentane or Hefner lamp in a dry winter atmosphere than in a moist summer atmosphere. The gas flame changes also, probably about the same amount, so that a photometric measurement of a gas flame against a flame standard does not give the real candle power of the gas at the time, but does give a measure of what that candle power would be if the flame were burning in an atmosphere of average humidity. This is as it should be, for the object of the photometric measurement is to test the quality of the gas delivered, for which the company is responsible. The gas company should obviously not be held responsible for changes in candle power due to the atmospheric moisture. Thus, while the actual candle power and the gross heating value both vary considerably with atmospheric humidity, the *relative* candle power and the *net* heating value are both independent of atmospheric conditions, and hence may properly be employed in determining the light giving and the heat giving power, respectively, of the gas.

Shall the Actual Net Heat be Substituted for the Gross?—If it is granted in view of the above consideration, that the net heat is the proper quantity to specify as indicating the quality of the gas, the practical difficulty remains that in many ordinances and rules a gross value of 600 B. T. U.'s is now specified, and it is difficult to change established practice. Even if a change could be readily made, 600 B. T. U.'s sounds better than 550, and some feel that the latter figure does not give the gas manufacturers credit for all the heat they have put into the gas. This difficulty, and the practical difficulty of changing established rules, can be largely overcome by allowing the gross value of 600, or the corresponding total, to remain in the rules and ordinances, but to add by way of amendment that *for purposes of test* 550 B. T. U.'s net (or whatever is found to be equivalent) shall be construed as equivalent to 600 gross. * * * I suggest that a committee of the American Gas Institute working in co-operation with the Bureau of Standards might give the matter careful study, and report their findings to the Institute and the public. I believe that the Institute and the gas interests at large would favor the adoption of such changes in practice if on careful study they appear to be just and practicable.

Public Service Commissons.

[Prepared by MR. ALTEN S. MILLER, for the Seventh AnnualMeeting, American Gas Institute.]

In so far as the decisions of the public service commissions reflect the mental attitude of the public toward public service corporations, the title of this paper is correct; but it is not intended to confine the discussion to Commissions. In spite of all that has been written and said, about the interests of the public and public service corporations being identical, this fact is understood by but a small portion of the public, and is by no means fully understood by all the owners, officers and employees of the public service corporations. This will excuse the following statemeut of facts which should be clearly understood by everyone:

None of our larger cities could exist without its public service corporations, nor could the cities grow without the extension of the facilities furnished by them. No city, or part of a city, can prosper without good service from the transportation, light and power companies. No railway, gas, or electric light company could exist outside of a thickly settled section, nor do such companies prosper when the districts in which they are situated are not prosperous. The corporations are for the benefit of the communities; the latter were not built up for the benefit of the corporations.

Many experiments, resulting in bad service and financial loss, have proven beyond question that, under our present political system, the municipal officers have not been able to manage street railways, gas and electric properties. The municipalities should, therefore, make every effort to assist those who are willing to put their money into such plants to secure the necessary funds at the lowest rate, and should encourage the owners to make all expenditures and to do everything necessary to secure the best possible service.

As the laws are now administered—and apparently understood—by the courts and commissions, the result is just the opposite. It is well-nigh impossible to raise capital for a new enterprise and is increasingly difficult to finance improvements and extensions to established properties. In abandoning or replacing property in the interest of economy or good service there is serious risk of confiscation of capital; and good management is assured no reward.

The general tendency is to base rates on the "fair value of the property being used * * * for the convenience of the public." The rate of return allowed on this valuation has seldom, if ever, exceeded 8 per cent., and in some cases has been less than 6. As this is not a sufficient reward to compensate for the risk of failure of a new enterprise, people will not furnish money to build new railroads and the country is insufficiently and improperly developed.

This same tendency to base rates solely on the value of property being used, and to ignore the value of the service to those receiving it, militates against the installation and extension of all public service corporation plants and removes the incentive for economical and efficient management. The latter point can best be illustrated by several cases. The first case is that of a large company, which, in the interest of good service and economy, abandoned several of its plants after building a new plant to do the work of all the others. This resulted in a very large saving, which was promptly given to the company's customers in the form of a reduction in rates. When the property was valued, no credit was given for the many hundreds of thousands of dollars invested in the abandoned plants, which, therefore, became a total loss.

The other side of this picture is in a city which is provided with several plants doing work which could to better advantage be done by one. Knowing the penalty of abandoning plants the managers wisely keep all in operation, and the extra expense resulting therefrom is paid by the public. Is there any question that, in the light of our present knowledge, the consolidation and abandonment of plants will cease?

Another case is that of a small company operating near a large city. This company could close its plant and secure service from outside at less than its present cost of operation. The management would be willing to do this and to give all the saving to the customers of the company; but, if this is done the generating plant will not be used for the convenience of the public, and a zealous commission, by lowering the value of the property, may find reason for ordering a still further reduction in rates. Again, the public is called upon to bear expense needlessly incurred and nobody profits thereby. The question is, how is capital to be tempted to fully develop our public service properties, and how is an incentive to good and economical management to be given?

Capital will seek the investment showing the highest rate of return, taking due account of the risk, and this is not found at the present time in the building of new plants for supplying the public with transportation, light, gaseous fuel or power. As a result the inadequately developed sections are suffering and it becomes necessary to see what can be done to secure capital.

Everyone will admit that those who take the risk of developing a new enterprise are entitled to a greater return than those who invest in a well established business. In the past these additional returns were secured through a bonus of stock, which, with the bonds, was sufficient to pay for the risk. Under the laws as at present administered in many States bonus stock may not be issued, so that means must be found to compensate in some other way for the extra hazard. To this end the following plan is suggested:

At the time of the formation of the company and the issuance of the prospectus, a careful estimate will be made showing the cost of construction and the cost of securing the business and placing the new company on a permanent earning basis. The money raised for this purpose from the sale of stock or stock and bonds shall be entitled to a rate of return in excess of the earnings to which the capital raised by subsequent issues is entitled.

For a series of years after the corporation is in business the money raised for additions and improvements shall be entitled only to a somewhat lower rate of return than the original amount raised.

After the business is thoroughly established, and has sufficient history behind it to enable the company to raise an abundance of capital at moderate rates, all money so raised shall be entitled only to a still lower rate of return than either of the first two amounts.

Call the amounts raised as above described, A, B and C, and, for the purpose of illustration, say that A is entitled to receive an annual dividend of 12 per cent., B to 10 per cent. and C to 8 per cent.

In case a portion of the capital is raised by an issue of bonds, the mortgage will provide that the interest on the bonds must be paid each year before any dividends are declared, and that, in the case of liquidation of the assets of the corporation, the bondholders will be paid the full value of their bonds provided the assets are sufficient.

If the value of the assets does not exceed the face value of the bonds the entire proceeds of the liquidation go to the bondholders and the stockholders lose the total amount they have invested. In case the earnings of the property are sufficient only to pay the bond interest, the stockholders receive no return on their investment. The stockholders, are, therefore, in the position of guaranteeing, to the extent of their investment in the property, the principal and interest of the bonds. For this reason it is proper that the stockholders should be allowed to divide the difference between the total earnings and the amount paid in bond interest, provided the earnings do not exceed the amount stated in the franchise.

In case it is decided to raise A by an equal issue of stock and bonds, the latter to bear interest at 5 per cent.. the stock issued under A would be entitled to dividends of 19 per cent., but in case the amount A was raised entirely by the issue of stock it would be entitled to only 12 per cent. in dividends.

In case the amount B were raised entirely by bond issue, A having been raised by a stock issue, and in case B should be equal to A, then the stock of the company represented by the investment A would be entitled to dividends of 17 per cent. as against 12 per cent., if B is raised by a stock issue.

Assuming A and B $1,000,000 each and C as $5,000,000, the stockholders would be entitled to the following dividends: On A, $120,000; on B, $100,000; on C, $400,000.

In raising the money the corporation would be at liberty to use either stock or bonds. In case bonds are issued for a portion of the amount A, the difference between the amount to which the total investment A is entitled and the amount paid for interest on these bonds shall be divided between the stockholders in Class A.

In case the Class A capital is raised entirely by stock issues, and Class B is raised partly by stock and partly by bonds, the difference between the interest on the bonds and the amount earned from the proceeds of the bonds shall be divided between the Class A stock and the Class B stock in proportion to their face value.

In case bonds are issued for a portion of Class C capital, the difference between the amount paid for interest on these bonds and the earnings from the investment of the proceeds of the bonds shall be divided between the stock issued in Classes A, B and C.

All Class B and Class C stock shall be offered at auction and the premium shall not be capitalized or entitled to any earnings, but shall go to strengthen the enterprise. In case it may become necessary to sell bonds below par, the discount may be charged against the premium received from the sale of stock.

The foregoing plan will provide for new enterprises and it remains to encourage extensions to existing plants. The first step in this direction is to safeguard the capital now invested. It is doubtless true that in many cases stock and bonds have been issued at a discount, but the investor has usually taken due cognizance of the fact that the market price of the property as a whole is not affected thereby. In the aggregate the amount of what is commonly called "water" is extremely small in proportion to the total investment in the properties under discussion, and the effort to find and eliminate it is costing in actual time and expenditure and in its influence on values of all kinds, many times the actual amount involved. The continued agitation upsets business, hurts values and discourages the making of investments in the interest of economy and better service. In the interest of all concerned the agitation should cease, and to this end a rapid examination should be made by the properly constituted authorities of the rates, the property, the indebtedness and the market value of the stock of all public service corporations.

If the rates charged for service are reasonable in comparison with those prevailing in other places similarly situated, and the earnings are not unreasonably high, the public should be so informed and the corporation should be aided and encouraged to secure every possible economy in operation and to give the best possible service. This is a business proposition and should be handled by business men using business methods. Until such time as the values of the properties of public service corporations are recognized, and so placed on a stable basis, it will be increasingly difficult to secure capital for existing as well as new enterprises. When the basic value has once been determined in the case of an enterprise, it is only necessary for the public to know that the property is kept in repair and that the new capital expenditures are properly made. The rate of return on the capital invested must be sufficient to compensate the investors for all risks incurred in building the plants and developing the business, and to encourage expenditures for the purpose of developing new territory and of improving the service. The net result of establishing a definite basis will make it possible to secure additional capital for development, will reduce the amount paid for this capital, and will be greatly to the advantage of the public. Ten years from the time that such a plan is adopted the public will be getting much better service or lower rates, or both, than will be the case if present conditions continue.

Up to this point the problem under discussion has been the encouragement of capital to invest in public service corporations. Such investment is to be for the purpose of developing new territory and extending existing installations. The public is also deeply interested in the operation and maintenance of the property after it is established, and should render all possible aid and encouragement to the corporations in securing economical operation and good service.

It is useless to expect continued efforts on the part of the managers to reduce expenses if the entire saving is to go to the customers. Continued effort in any direction, without the spur of necessity or the promise of reward, cannot be secured. While pride will keep the organization from backsliding too far, progress will be slow and efforts will be diverted to other lines that promise rewards.

As an encouragement to economy and rate reductions, the sliding scale of rates as adopted many years ago by the London gas companies has accomplished much. This plan makes the dividends depend upon the price of gas and as the price of the latter is decreased, the dividends may be increased. The main objection to this plan is the inducement it furnishes to neglect the upkeep of the property. When the stockholders and customers are both interested in the reduction of operating expenses, it is quite probable that the reduction will be carried too far, and that in the long run both the company and the customers will suffer, the latter from bad service as well as an increase in rates.

In practice nothing else has been found to work so well as the London sliding scale referred to; and, if it is so safeguarded as to compel the upkeep of the property, it will encourage continued effort to secure economy in operation and will benefit stockholders and consumers alike.

When the values and rates have been established, the commissions should approach the problem of abandoning property in the interest of economy and good service. Where it is found advisable to abandon property, its value should be ascertained and, if the reserve for depreciation is not sufficient to permit it to be written off at once, the the annual charge to the depreciation reserve should be made sufficiently high to permit the abandoned property to be written off in a reasonable time.

In any case the rate should provide for liberal reserves for depreciation and contingencies, and the accumulation should be invested in extensions and improvements, in the bonds of the company or in other forms of good securities.

If it were possible to put into effect at once the plan for protecting the value and earnings of the public service corporations as outlined, the advantages to the people as a whole during the next 10 years would be measured in hundreds of millions of dollars. This advantage would be realized not only in the form of reductions in rates, but to a large degree in the increase in development and in improvement of service.

Court of Appeals Refuses Long Acre Company Permission to Issue Bonds.

The Court of Appeals recently handed down a decision, on a writ of certiorari obtained by the New York Edison Company, to review an order of the Public Service Commission of the First District authorizing the Long Acre Electric Light and Power Company to issue $2,000,000 worth of bonds. By a vote of 4 to 3 the Court decided that the Long Acre Company has no power to issue bonds for the purpose of entering the electric light business in the boroughs of Manhattan and the Bronx without obtaining first a certificate of convenience and necessity from the Public Service Commission.

The Public Service Commission originally denied the application of the Long Acre Electric Light and Power Company for permission to issue securities and also denied a rehearing. Thereafter the Long Acre Company caused this determination to be reviewed by a writ of certiorari issued by the Appellate Division of the Supreme Court. That Court reversed the determination and referred the application back to the Commission for consideration and action. The Court said in substance that the reasons for the denial of the application by the Public Service Commission were based on the underlying proposition that there should be no competition in the business of public lighting, as it was the just policy of the State to prevent such competition. The Court held, however, that there was nothing in the public service law relating to gas and electric companies to show that the right to determine whether such competition should be permitted had been delegated to the Public Service Commission. In June, 1910, the Public Service Commissions law was amended and the section relating to gas and electric companies was re-enacted so as to give the right to the Commission to determine the question of public convenience and necessity. Subsequently the petition of the Long Acre Company was considered again by the Commission and the New York Edison Company appeared, as an interested party under the amendment of 1910, to show that the franchise claimed to be owned by the Long Acre Company was never operated and used according to law, and also to show that no public necessity exists for a competing company. The Commission granted the application of the Long Acre Company against the objection of the New York Edison Company, and the latter thereupon applied for a rehearing by the Commission, which was denied. The New York Edison Company appealed to the Court, with the result that by a divided opinion the Appellate Division upheld the authorization of the issue of $2,000,000 bonds on certain conditions.

The New York Edison Company then took the case to the Court of Appeals, with the result stated above. The Long Acre Company will now have to apply for a certificate of convenience and necessity from the Public Service Commission and meet the arguments of the New York Edison Company to the effect that corporations subject to the prevailing public service regulations cannot at the same time be subject to competition. The New York Edison Company contends that if it is to be regulated in the present manner it should be protected by the State against competition and that if competition is to be permitted should be relieved of such regulation and allowed to meet competition in competitive districts at competitive rates.

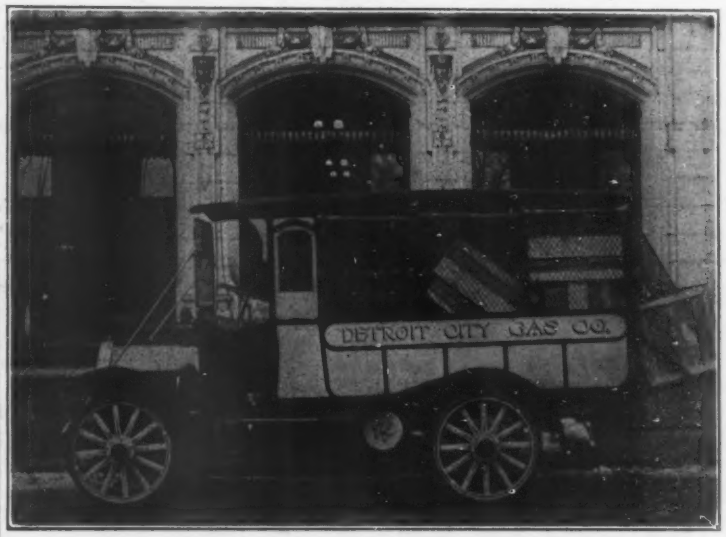
The Long Acre Company was incorporated to manufacture and distribute electricity in the boroughs of Manhattan and the Bronx, and could put poles, wires and conduits on and under the streets with the consent of the municipality. It did not apply to the Public Service Commission for permission to construct its plant, claiming that its right to do so is superior to the restrictions imposed by the Public Service Commissions law.

New Methods and Appliances.

THE ADAPTABILITY OF MOTOR TRUCKS.—In the great variety of published description respecting the efficiency and economy of the motor truck it is more than strange that one of its most important useful attributes is frequently overlooked. It is its remarkable adaptability that enables it to be adapted to almost any line of business simply by mounting on the chassis special bodies and equipment suited to given trades. Every manufacturer, of either gasoline or electric trucks and light wagons, has adopted the plan of building the entire running gear and driving mechanism as a complete operative unit independent of the body, and there is usually no connection between this chassis and the body, except the bolts necessary to hold the latter in place on the frame. Any desired style of body can be mounted on any chassis, within certain limitations of size and weight.

A comparatively recent development is the making of each model in several lengths of wheelbase and frame length, to take short, medium, long and extra long bodies, the only difference in construction being the length of side frames, the drive shaft, brake rods, etc. Thus, a truck of any given load capacity can be fitted with a short, strong body for carrying hardware, machinery or other heavy material; medium length body for ordinary service, like the express business, general hauling, department store work, etc,; or with very long body for boxes and barrels, beds and mattresses, cornices, theater scenery, etc.

These and many other different types of bodies will be seen on the new models of motor trucks and delivery wagons during the New York Automobile Show, the week of January 20 to 25. One maker



One-Ton Federal Truck.

alone, who manufactures only a 3,000-pound capacity vehicle, will show 11 different styles of bodies on his machines, just to indicate the great diversity of application. Other manufacturers will also make the most diversified exhibits possible, and salesmen in attendance at the different stands will be provided with albums of photographs showing scores of other applications and body styles, from fire department apparatus to funeral cars.

Some unusually interesting and spectacular exhibits are among the 250 models to be shown by 68 manufacturers in the Grand Central Palace and Madison Square Garden. Aside from merely building special bodies to mount on standard chassis, the truckmaker often goes to great lengths to give a customer a work vehicle especially suited to his need. In designing and fitting to the chassis special mechanism he offers the contractor and coal dealer trucks with dumping bodies operated by the truck motor; or he constructs a short, strong, tractor that can be coupled to a pair of steel-tired rear wheels, to act as a trailer for hauling extra long timbers, rails or structural steel beams. Such trailers can be connected to hook and ladder trucks, standpipes or even steam fire engines to take the place of horses, in and around gas plants, etc.

Trucks used by electric light and power companies, and by safe and machinery concerns, have powerful winches that can be driven by the vehicle motor to haul cable through conduits, stretch overhead cables, set up tall electric light poles, hoist safes to upper stories of office buildings, load and unload heavy machinery, etc.

Tank trucks for handling oil in bulk are common. Similar vehicles equipped with pumps driven by the vehicle motor are employed for street sprinkling, while recent novel applications are machines for spreading hot crude oil and tar on street surfaces. Both centrifugal and reciprocating pumps driven by the truck engine are built into machines for use as fire engines.

Thus, the motor truck is not merely a substitute for horse-drawn vehicles, but is an independent, self-moving power plant that can be adaptable to many special purposes that cannot be served by any other single means. The cut explains itself.

THE TRAVERSE CITY (MICH.) COMPANY'S SHOW WINDOW.—The illustration and its underlines tell the story of what the gas folks in charge of the Traverse City (Mich.) Gas Company are going to show

Stewart Hotel Range. Detroit Combination Cake Griddle and Broiler. Stewart Table Range. Humphrey Water Heater.

the inhabitants a thing or two that may be successfully and economically done in the kitchen by means of gas.

Recent Patent Issues.

Prepared for the AMERICAN GAS LIGHT JOURNAL by ROYAL E. BURNHAM, solicitor of patents and counselor in patent causes, 833 Bond Building, Washington, D. C., from whom illustrations and specifications of any patent mentioned below may be obtained for 20 cents.

1,048,533. Gas Separator. L. A. Hoffman, Jr., Leetonia, O.

1,048,676. Automatic Cut Off for Gas Stoves. L. W. Freeman, Portland, Ore., assignor, by mesne assignments, to said Freeman and J. O. Halverson, same place.

1,048,716. Gas Burner. J. H. Martindale, Lakewood, O., assignor of one-half to E. G. Gilbert, same place.

1,048,764. Gas Cock. J. Tolhurst and A. Wait, Hamilton, Canada.

1,049,002. Lighting Device. R. E. Schneider, Trenton, N. J.

1,049,034. Gas Generator. T. H. Armstrong, Chicago, Ills., assignor to S. Pearlman, same place.

1,049,045. Gas Lighter. C. Brussell, New York city.

1,049,317. Gas Washing Apparatus. H. E. Theisen, Munich, Germany.

1,049,522. Electric Gas Lighter. J. Y. Parke, Philadelphia, Pa.

1,049,561. Apparatus for Removing Ashes from Gas Producers. W. E. Bradley, Pittsburgh, Pa., assignor to Duff Patents Co., same place.

1,049,559. Gas Furnace. A. Folliet, Brussels, Belgium.

1,049,588. Oven Burn-Controlling Device. W. L. Mersfelder, Kennedy Heights, O., assignor to the Graves Supply Co., New York City.

1,049,769. Gas Arc Lamp. H. Rubin, New York City.

1,049,778. Apparatus for Making Gas from Liquid Fuel. G. M. S. Tait, Montclair, N. J., assignor to Interstate Investment Co., Washington, D. C.

1,049,848. Gas Burner. N. G. Goreau, New Orleans, La.

1,049,986. Gas Fixture. G. Breck, San Francisco, Cal.

1,049,994. Gas Producer. W. B. Chapman, New York City, assignor to Chapman Engineering Co., same place.

Items of Interest
FROM VARIOUS LOCALITIES.

THE Boston Consolidated Gas Company recently flooded the mails with a "picture sheet," showing in plain style these things: The centerpiece is a ground plan (bird's eye view would be better) of the Everett works. To the left are these illuminatings: Gas light in the store; gas in the Copley-Plaza kitchen; gas heat, one of several methods—this particular example shows a "happy couple," not remotely removed from each other, "basking" in the heat and light emitted by a gas log set on antique andirons inside the lines of the chimney breast. To the right is an apt illustration of gas light in the home, the scene depicting father, mother, daughter and son gathered at a round table, all busily engaged with books, papers and the like. The second example is a view of the huge warehouses of the Fargo Real Estate Trust, in which stupendous buildings electric currents for lighting and power use therein are generated by power from gas-driven dynamos; and the last picture is that of a daintily dressed person, who is changing the dishes in which meats are cooking, bread is baking, pastry is browning, etc. The title of the folder picture sheet is "1,000 Aids to Progress."

THIS is the way the hearing resulted that had for its purpose the reduction in the rates for electric and gas currents supplied from the plants of the Granville (N. Y.) Gas and Electric Company—the hearings were had before the up-State Public Service Commission: The electric schedule is ordered reduced to 13 cents per kilowatt-hour—the ruling rate was 15 cents; and the gas rate at present charged ($1.50 per 1,000 cubic feet) is adjudged reasonable, and is not ordered altered.

APPLICATION has been made for a charter under which to operate a gas works for the supply of that product to the residents of Lansfield and Summit Hill, Pa.

THE annual meeting of the H. Mueller Manufacturing Company's Salesmen lasted one week, the closing scene of the affair being a banquet that will long be remembered in Decatur, and that will never be forgotten by those who shared in its wonderful surprises. The reunion was brought off in the beautiful ballroom of the Country Club, and the "distinguished" guests were the '49 Club, the members of the firm, the heads of its departments, Mayor Dineen, the City Commissioners and a few invited guests. Possibly 150 were in the feast. There was never an idle moment during the proceedings—how could there be when Adolph and "Fred." Mueller were "on the job?" And if "Will. Dill" attempted to carry home all the pieces of jewelry that Mr. Adolph Mueller presented to him during the feasting, as tokens of the Company's regard for his services, he must yet be going home. "Fred." Mueller worked in some surprising movements, the thinking out of which must have cost him many a busy hour. Mr. Adolph Mueller acted as Toastmaster, and right well did he stand on the job. A very readable account of the affair was printed in the Sunday, January 5th, issue of "The Decatur Herald."

THE Warner Village Improvement Association, of Woodbridge, Conn., which place is not very far away from New Haven, is anxious to have a gas supply, during the summer seasons at least. The President of the Association (Dr. E. F. Johnson) being a fairly prosperous man, and, of course, quite on the professional order, favors a separate plant; but as he is amenable to reason why it is likely, when he examines the thing from the standpoint of practicability, and if the New Haven Gas Light Company thinks it is worth while—Woodbridge is perhaps 6 miles north, northwest of New Haven—possibly he can make terms for a gas supply that will be quite reasonable—and lasting.

THE Bennington (Vt.) Gas Light Company has been absorbed by the Twin State Gas and Electric Company, of Brattleboro, Vt.

MR. SOLOMON CASPER, Chief Salesman of the Southern Division, Public Service Company, of Illinois, will hereafter make his headquarters in Streator, Ills.

AT the instance of Commissioner Dean, Mayor Porter, of Kansas City, Kas., has appointed a commission of 3 to determine the cost of building a municipal gas plant and "to prove the cost" of making artificial gas. Commissioner Dean (Public Parks), Cable (Water and Light) and Higgins (City Counsellor), were appointed as such investigating body. The gentlemen named are proposing, of course, to consult gas engineers in respect of the proposition, and they will likely visit several cities in quest of information. Meanwhile it is safe to make the statement that one of the first to attempt to hook-up with the investigators will be that bobbiest of expert jobbers, Mr. Marks.

MR. A. S. B. LITTLE, General Manager, the Consolidated Gas Purification and Chemical Company, of Nashville, Tenn., in a message dated the 8th inst., informs us that about 300 requests have been sent in for the new book on "Purification," which is being issued by the Consolidated Gas Purification and Chemical Company, which certainly seems an unprecedented demand for a public ation that necessarily must carry more or less matter of an advertising character. However, those who recall the last pamphlet from the like source, will not wonder greatly over this demand, for Mr. Little knows how to say much in little. In fact he declares, ere the winter melts into spring, that the book's circulation shall have gone to 1,000.

"ISAG," writing from Grand Forks, N. D., under date of the 7th inst., says: * * * "This place claims 15,000 population, and towns claim enough as a usual thing. Strange-to-say this is the low period of gas sales, but the gas plant is working three benches of 6's for everything that can be taken out of them. The plant is snug, compactly built, and adjoins the steam-electric plant. In front is

the office, facing the Mail street. It is a handsome, well appointed room—perhaps a bit too small—for displaying gas and electric appliances, with perhaps an accent on the 'E.' The gas men in this section of the country are peculiarly fortunate in respect to gas coal. 'Dock' coal is used, and it is generally screened. This coal is screened at the docks, and is usually delivered at the plant, in from 24 to 72 hours after loading. As it is required to be shipped in box cars the coal arrives dry and in fine condition. Some day someone will invent a practical dump-car, with removable roof, so that the coal can be loaded as easily as in a gondola, and its contents be kept from snow, sleet and rain as well as in a box car, and be dumped as easily as the refuse from a battle ship."

THE Benton Harbor-St. Joseph Gas and Fuel Company, of Benton Harbor, Mich., has awarded a contract to the Gas Machinery Company, of Cleveland, O., for a complete new coal gas plant, comprising inclined silica retorts and settings, exhausting, condensing, washing and scrubbing apparatus, ammonia concentrator, coal and coke handling machinery, etc. The new coal gas plant will be built on a plot of ground adjoining its works, which was recently purchased by the Gas Company. The foundations and buildings are in course of construction.

MR. JOHN EYRE MORGAN, formerly with the Atlantic City (N. J.) Company, has been appointed General Manager of the Hanover (Pa.) Gas Company.

MR. JAMES O'HEARN, who has been in the Company's service since 1897, has been made General Works' Foreman, the Mohawk Gas Co., of Schenectady, N. Y. His predecessor (Mr. F. H. Hawkins) has returned to his home in Toronto, Ont.

AT the annual meeting of the Cranford (N. J.) Gas Light Company the Directors elected were: Hon. John Kean, Francis Engel, Hamilton F. Kean, H. U. Udell and Julian H. Kean.

WRITING of ex-Senator Kean puts us in mind of the fact that, in the near future, the net rate will be made by the Elizabethtown Gas Company, of Elizabeth, N. J., of 90 cents per 1,000 cubic feet. The present gross is $1.25 per 1,000, less 25 cents for prompt payment, and the new net will call for a rebate of 35 cents.

THE new schedule at Easton, Pa., calls for these payments:

Monthly Consumption.	Per 1,000.
First 10,000 cubic feet	$1.20
Next 10,000 " "	1.00
Next 10,000 " "	.90
All in excess of 40,000 cubic feet	.85

Each of the quantity uses specified above is subject to a rebate of 10 cents per 1,000, for prompt payment—within 10 days. The minimum bill is 50 cents per month.

THE annual minstrel show and reception of the Central Union (N. Y.) Gas Company's employees will be held in the McKinley Square Casino, 169th street and Boston road, the evening of the 24th inst. That indefatigable coach (J. Guilfoyle) declares that this show will be a fall pippin of the Old Newtown (L. I.) variety. In fact some of the Central Unioners say that they'll make the Engineer of Utilization, Consolidated Gas Company, look to his laurels.

"GASFITTER," writing from Waterbury, Conn., under date of the 14th inst., says: Dear JOURNAL—At a meeting of the employees of the United Gas Improvement Company's station at Waterbury, held the 14th inst., Mr. Charles E. Blood delivered a lecture on "Arc Lighting and New Business." The energetic speaker treated his topic in a forceful way, and he was rewarded at the close of his presentation by a volley of applause that testified well to the satisfaction of his auditors. A very successful arc campaign is on in this bustling Connecticut city, and the pace, as set to date, resulted in the placing of 5 arcs per day average. This gait, however, is not fast enough for Mr. Hawley's hustling salesmen, and before the campaign is closed the daily output will be well in excess of the number stated. Over 100 employees attended the Blood discourse.

"THE Goshen (Ind.) Gas Company," so writes "L. M. L.," under date of the 10th inst., "is a progressive institution, which is likely the reason that it gets along so well with the residents. With the coming of Dr. W. W. Johnson, as Manager, the growth in business done by the Company has increased with wonderful rapidity. The books list 1,879 consumers, and every day witnesses an addition to the number. In fact the growth has been so rapid that it became necessary to plan additions to the plant, so Dr. Johnson asked his Board for an appropriation to carry on the betterments. Agreeing with him over the necessity that exists in this respect, the sum of $20,000 was voted him. Fifty per cent. of this sum will be expended next spring on works' proper account, and the other half will go to main extensions. The mains have already been carried across the Elkhart river, and the thought is to extend to and through the settlement or suburb known as West Goshen. Dr. Johnson declares that the Company's growth cannot be repressed, if excellent service may be counted on to attract the attention of the public."

THE Massachusetts Board of Gas and Electric Light Commissioners, in an order handed down the 9th inst., which order is the result of a determination reached by the Board after several hearings, decreed that the rate for gas supplied to the residents of Haverhill, shall not exceed 80 cents on and after the 1st prox.

MR. WILLIAM F. CROSTON, formerly with the Rochester (N. Y.) Railway and Light Company, has been appointed Superintendent of the Newport News (Va.) Gas Company, and will also have charge of the Hampton-Phoebus-Fortress Monroe (Va.) gas supply. Graduating from the University of Rochester, Class of 1904, Mr. Croston entered the service of the Rochester Railway and Light Company, remaining with that corporation until June, 1912, when he became Superintendent of the gas division of the trading of the Watertown (N. Y.) Light and Power Company—June, 1912 to January, 1913.

THE Parker-Russell Mining and Manufacturing Company has closed a contract with the Grand Rapids (Mich.) Gas Company for 10 through benches of eights, 20 feet retorts. Also, 1 Fiddes-Aldridge charging and discharging machine for 4-tier benches, and the Aldridge and Gibson patent doors for the bottom of the continuous coal bin.

QUERY No. 142, in the January issue of "The Gas Institute News," has to do with "Pipe Protection," and it was thus answered by Mr. W. G. Wilson, Secretary-Treasurer, Master Painters' Association of U. S. and Canada: The best protective coating for iron or steel consists of a paint containing a vehicle made of boiled oil, china wood oil, new process linseed oil varnish and best Trinidad asphaltum in which any paint pigment can be used to the consistence required. This paint is absolutely salt and moisture proof; can be submerged indefinitely in the strongest brine solution, without any apparent effect; will resist soil acidity; is not easily affected by coal gas or acids; will dry under conditions that would absolutely destroy the best linseed oil paint, regardless of pigment. The only precaution to be observed is in the cleaning of the iron or steel from all mill scale, rust, dirt, grease, etc., and the metal must be perfectly dry when painted. High-priced paints do not count, and dopes such as are used on iron and steel pipes are no protection. Coal tar preparations applied directly to the iron are failures, but some of the gas tar paints last well if used over the steel protective coating as a final heavy coat. The matter of protecting iron or steel pipes that will be submerged I do not consider a difficult one. The mistake is in taking for granted that any paint will do. A special paint for the special purpose must be used, and with due precautions as to application and the difficulty is overcome. A paint made by my formula by the Atlas Paint Company, of Nashville, Tenn., comes very near solving this problem. When directions for application are carefully followed the desired result will be attained.

MR. R. C. WILSON, formerly in the employ of the American Gas Company, of Philadelphia, and Superintendent of the Freeport (Ills.) Gas Company since the 1st inst., will have a busy initiation season, according to the plans determined upon. These include the reconstruction of the plant and the construction of a large gasholder, and the laying of several miles of mains; further, the Company will erect a modern office building, on the plot purchased some time ago at the junction of Stephenson and Walnut streets. This should keep Mr. Wilson fairly busy for the time being.

"B. V. R.," writing from Philadelphia, Pa., under date of the 9th inst., says: "I failed to notice any mention in the JOURNAL of the great record made by the use of a pulmotor in Pittsburgh last Christmas day. During the progress of a rather severe conflagration in that city the day mentioned, 12 firemen were prostrated through inhaling smoke. They were immediately rushed to the Homoepathic Hospital, and after working over them for some time the physicians declared that seven of them were beyond recall. Someone suggested calling in the aid of the pulmotor, and one was hurried to the hospital from the gas office. Through renewed effort and the efficiency of the named device the seven were restored to consciousness and life."

The Market for Gas Securities.

Quite a sharp drop is to be recorded this week in respect of reported values for Consolidated gas. The decline amounts to exactly 2 points, and is traceable to no other cause than to unrest which seems to gather force as the time nears for President Taft to put aside the Presidential office. By-the-way, this current week was likely the banner one for gas output on Manhattan Island. Dark, chilly days make busy times for the Astoria men.

Brooklyn Union shows no change in the week, the new figures to-day (Friday) being 138 to 142. There is, however, no change from the former lethargic state of these, in so far as the Exchange is concerned. The innate strength of Peoples, of Chicago, reflects the cleverness of its President's perspicacity. In fact, this week, when almost everything else on the list shows a loss, Peoples comes in with a gain of 1½ points.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.
115 BROADWAY, NEW YORK CITY.

JANUARY 20.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share:

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked*
Consolidated Gas Co.	$78,177,000	100	138	138¼
Central Union Gas Co.—				
1st 5's, due 1972, J. & J.	8,000,000	1,000	103	106
Equitable Gas Light Co.—				
Con. 5's, due 1932, M. & S.	1,000,000	1,000	105	106
Mutual Gas Co.	3,500,000	100	152	157
New Amsterdam Gas Co.—				
1st Con. 5's, due 1948, J. & J.	11,000,000	1,000	101	102½
New York & Richmond Gas Co. (Staten Island)	1,500,000	100	35	50
1st Mtg. Gold Bds. 5 p. ct.	1,500,000	—	98½	100½
New York and East River—				
1st 5's, due 1944, J. & J.	3,500,000	1,000	103	105
Con. 5's, due 1945, J. & J.	1,500,000	—	95	100
Northern Union—				
1st 5's, due 1927, J. & J.	1,250,000	1,000	99½	101
Standard	5,000,000	100	60	70
Preferred	5,000,000	100	90	100
1st Mtg. 5's, due 1930, M. & N.	1,500,000	1,000	103	105
The Brooklyn Union	15,000,000	1,000	138	142
1st Con. 5's, due 1948, M. & N.	15,000,000	—	106¾	107
Yonkers	200,650	500	130	—
Out-of-Town Companies.				
Bay State	50,000,000	50	⅛	⅝
" Income Bonds	2,000,000	1,000	—	75
Binghampton Gas Works	450,000	100	—	—
" 1st Mtg. 5's	500,000	1,000	97	100
Boston United Gas Co.—				
1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	5	8
Bonds, 5's	5,250,000	1,000	59	60
Capital, Sacramento	500,000	50	—	35
Bonds (6's)	150,000	1,000	—	—
Chicago Gas Co. Guaranteed Gold Bonds	7,000,000	1,000	104	106¼
Cincinnati Gas and Electric Co.	29,500,000	100	87	90
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	96	98
Columbus (O.) Gas Lt. & Heating Co.	1,682,750	100	90½	91
Preferred	3,026,500	100	75½	80
Consumers, Toronto	2,000,000	50	200	204
Consolidated, Baltimore	13,460,084	—		—
Mortgages, 5's	3,400,000	—		—
General Mortgage 4½	10,661,000	—		—
Con. Gas Co., Baltimore City, 4½	2,751,000	—		—
Consolidated Gas Co. of N. J.	1,000,000	100	15	—
Con. Mtg. 5's	976,000	1,000	94	96
Bonds	75,000	—	—	100
Detroit City Gas Co.	6,560,000	—	—	50
Detroit Gas Co., 5's	381,000	1,000	75	80
" Prior Lien 5's	5,619,000	1,000	97	100½
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	—	101
Essex and Hudson Gas Co.	6,500,000	—	133	136
Fort Wayne	2,000,000	—	—	—
" Bonds	2,000,000	—	55	—
Grand Rapids Gas Light Co., 1st Mtg. 5's	1,350,000	1,000	100	101
Hartford	750,000	25	190	200
Hudson County Gas Co., of New Jersey	10,500,000	—	130	138
" Bonds, 5's	10,500,000	—	101	106
Indianapolis	2,000,000	—	38	45
" Bonds, 5's	2,650,000	—	104½	105
Jackson Gas Co.	250,000	50	82	—
" 1st Mtg. 5's	200,000	1,000	91	
Kansas City Gas Light Co., of Missouri	5,000,000	100	—	86
Bonds, 1st 5's	3,822,000	1,000	98½	99
Laclede Gas Co., St. Louis.	10,000,000	100	102½	103
Preferred	2,500,005	100	99	102
Bonds	10,000,000	1,000	102⅝	103
Lafayette Gas Co., Ind.	1,000,000	100	—	60
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	120	130
Madison Gas and Electric Co.				
" 1st Mtg. 6's	400,000	1,000	106	
Massachusetts Gas Companies, of Boston	25,000,000	100	91	92
Preferred	25,000,000	100	92½	93½
Montreal L. H. & P., Canada	2,000,000	100	236½	236¾
Nashville Gas Light Co.	1,000,000	100	110	—
Newark, N. J., Con. Gas Co.	6,000,000	—	97	98
Bonds, 6's	6,000,000	—	127	128
New Haven Gas Co.	5,000,000	25	189	190
Peoples Gas Lt. & Coke Co., Chicago	25,000,000	100	115	115½
1st Mortgage	20,100,000	1,000	102	102½
2d "	2,500,000	1,000	104	—
Rochester Gas & Electric Co.	2,150,000	50	88	—
Preferred	2,150,000	50	118	—
Consolidated 5's	2,000,000	—	104¾	105½
Pacific Gas and Electric Co.	15,500,000	—	60	61
St. Joseph Gas Co.—				
1st Mtg. 5's	1,000,000	1,000	96	98
St. Paul Gas Light Co.	2,500,000	100	—	—
1st Mortgages, 6's	650,000	1,000	104	106
Extension, 6's	600,000	1,000	112½	115
General Mortgage, 5's	3,447,000	1,000	94	96
Syracuse Gas Co., N. Y.	1,975,000	100	50	55
Bonds	2,047,000	1,000	101	103
Washington (D. C.) Gas Co.	1,600,000	200	427½	430
1st Mortgage, 6's	600,000	—	—	—
Western Gas Co., Milwaukee	4,000,000	—	—	—
Wilmington (Del.) Gas Co.	600,000	50	—	—

MEETING TIMES OF THE VARIOUS GAS ASSOCIATIONS.

American Gas Institute.—Annual meeting, Richmond, Va., October 15-17, 1913. Officers: President, W. R. Addicks, New York City. Secretary, Geo. G. Ramsdell, 29 West 39th st., N. Y. City.

Canadian Gas Association.—Annual meeting Sept. 1913. Officers: President, Arthur Hewitt, Toronto, Ont.; Secretary and Treasurer, John Keillor, Hamilton, Ont.

Empire State Gas and Electric Association.—Annual meeting, New York City, Oct. 8, 1913. Officers: President, C. G. M. Thomas, Long Island City, N. Y.; Secretary, C. H. B. Chapin, 29 W. 39th street. New York City.

Gas Meters.—Monthly Meetings; Chairman, Will W. Barnes; Commissioners, W. H. Pettes, L. W. Pefly: Secretary, H. Thurston Owens, 42 Pine street, New York City. Philadelphia Section; Chairman, L. R. Dutton; Commissioners, S. Grady, H. P. Dains: Secretary, H. F. Patterson, Jr., 831 Chestnut street. Cleveland Section, Secretary, A. B. Holtz, East Ohio Gas Co.

Guild of Gas Managers of New England.—Annual meeting, March, 1913. Young's Hotel, Boston; monthly meeting, second Saturday. Officers: President, Walter G. Africa, Manchester, N. H.; Secretary, H. K. Morrison, Brockton, Mass.

Illinois Gas Association.—Annual meeting, March 19th and 20th, 1913. Chicago, Ills. Officers: President, H. O. Channon, Quincy, Ills.; Secretary-Treasurer, Horace H. Clark, 115 No. Oak Park avenue, Oak Park, Ills.

Illuminating Engineering Society.—Annual meeting,———— September, 1913. Meetings of Sections, monthly. Pres., Preston S. Millar; General Secretary, J. D. Israel, 29 W. 39th street, New York City. Sections: New York, Secretary, C. L. Law, 124 West 42d street. New England, Secretary, H. C. Jones, 10 High street, Boston, Mass. Philadelphia, Secretary, L. B. Eichengreen, Broad and Arch streets. Chicago, Secretary, J. B. Jackson, 28 North Market street. Pittsburgh, Secretary, J. C. Mundo, Oliver Building.

Indiana Gas Association.—Annual meeting, March 12 and 13, 1913. Indianapolis. Officers: President, Howard L. Olds, Indianapolis; Vice-President, Wm. Wallace, Lafayette; Secretary-Treasurer, Philmer Eves, Indianapolis.

Iowa District Gas Association.—Annual meeting, May 22, 23, 24, 1913; Burlington, Ia. Officers: President, C. W. Fair, Atlantic, Ia.; Secretary, G. I. Vincent, Des Moines, Ia.

Kansas Gas, Water and Electric Light Association.—Annual meeting, October—— 1913. ———— Officers: President, L. O. Ripley, Emporia, Kas.; Secretary and Treasurer, W. H. Fellows, Leavenworth, Kas.

Michigan Gas Association—Annual meeting, September——1913; ———— Officers: President, W. S. Blauvelt, Detroit, Mic; Secretary-Treasurer, Glenn R. Chamberlain, Grand Rapids, Mich.

Missouri Electric Light, Gas, Water Works and Street Railway Association.—Annual meeting, April, 1913; Mexico, Mo. Officers: President, R. A. Bertrand, Joplin, Mo.; Secretary and Treasurer, P. W. Markham, Brookfield, Mo.

National Commercial Gas Association.—Annual meeting————————1913. Philadelphia, Pa. Officers: President, C. W. Hare, Philadelphia Pa.; Secretary, Louis Stotz, 29 West 39th street, New York City.

Natural Gas Association.—Annual meeting, Cleveland, O., May 20-22, 1913; Officers: President, M. B. Daly, Cleveland, O; Secretary, T. C. Jones, Delaware, O.

New England Gas Association.—Annual meeting, February, 19th and 20th, 1913 Boston. Officers: President, D. D Barnum, Worcester, Mass.; Secretary-Treasurer, N. W. Gifford, East Boston, Mass.

New Jersey State Gas Association.—Annual Meeting, April —, 1913, ———— N. J.—President, William H. Pettes, Newark, N. J.; Secretary-Treasurer, Arthur H. Osborn Belmar, N. J.

Ohio Gas Association.—Annual meeting, February ————, 1913, Columbus, O.; President, John M. Garard, Columbus, O.; Secretary, L. B. Denning, Columbus, O.

Oklahoma Gas, Electric and Railway Association.—Annual meeting, Oklahoma City May, ——1913. President, F. W. Caldwell, Shawnee, Okla.; Secretary, H. V. Bozell, Norman, Okla.

Pacific Coast Gas Association.—Annual meeting, San Jose, Cal., September 16, 17, 18, 1913. Officers: President, Henry E. Adams, Stockton, Cal.; Secretary-Treasurer, Henry B stwick, 445 Sutter street, San Francisco, Cal.

Pennsylvania Gas Association.—Annual meeting, York, Pa., April 9-11, 1913; Officers, President, H. H. Ganser, Norristown, Pa.; Secretary-Treasurer, W. O. Lamson, Jr., West Chester, Pa.

Society of Gas Lighting.—Annual meeting Dec., 11, 1913; monthly meetings, second Thursday. Place, New York City. Officers: President, Fred. S. Benson; Secretary, George G. Ramsdell, 29 West 39th street, New York city

Southern Gas Association.—Annual meeting, Charlotte, N. C., April 16-20, 1913, Officers: President, C. E. White, Montgomery, Ala.; Secretary-Treasurer, E. D. Brewer, Atlanta, Ga.

Southwestern Electrical and Gas Association.—Annual meeting, May 21, 22, 23 and 24, 1913, Galveston, Tex. Officers: President, F. M. Lege, Jr., Galveston, Tex.; Secretary H. S. Cooper, 405 Slaughter Bldg., Dallas, Tex.

Wisconsin Gas Association.—Annual meeting, May 14 and 15, 1913, Milwaukee, Wis. Officers: President, I. F. Wortendyke, Janesville, Wis.; Secretary-Treasurer, Henry Harmon, Milwaukee, Wis.